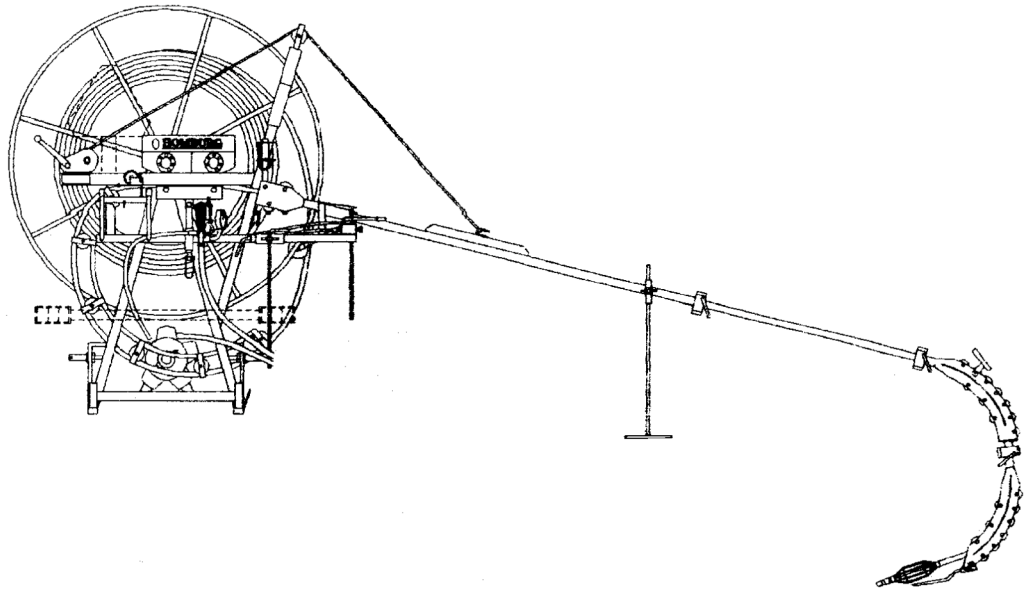


USER MANUAL

DRAIN CLEANER

Make : Homburg

Type : Junior JU-M135



Serial number: _____

Date : 1 June 2000

Issue No. : JU-2 (English)

Version : B

Homburg Machinehandel b.v.
It Noarderfjild 21

9051 BM Stiens
The Netherlands

phone : 0031 (0)58 2571555

fax : 0031 (0)58 2573535

E-mail : homburg@homburg-holland.com

website : www.homburg-holland.com



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1 PREFACE

(How to use this user manual)

We thank you for purchasing the Homburg Drain Cleaner type Junior with which you bought a high-quality machine. To make the most out of that high quality throughout the service life of this machine, it is necessary to accurately follow all instructions in this user manual.

In this user manual you will find all information you need for optimum and safe use and maintenance of the machine as well as guidelines to prevent accidents with the machine. This user manual is exclusively intended for users and maintenance technicians of the Homburg Drain Cleaner type Junior.

Therefore, we expressly recommend to completely read and understand this user manual before taking the machine into use. Do you have questions about the machine? In that case contact your superior, the importer or the manufacturer as soon as possible.

You will find the icons below throughout this user manual. They refer to increasing danger levels, as explained below.

HINT!

The instruction shown here describes an efficient method that may lead to gaining time or to an improved final result.



NOTE!

The instruction shown here provides the user with additional information. This instruction draws the user's attention to possible problems.



CAREFUL

If this instruction is not followed accurately, that may result in damage to the machine or the surroundings or to pollution of the environment.



WARNING!

If this instruction is not followed accurately, that may result in bodily injury or permanent disability.



DANGER!

If this instruction is not followed accurately, that will result in bodily injury, permanent disability or death.

For easy use of this user manual, it has been provided with:

- table of contents
- subject index
- list of illustrations
- conversion table ANSI units - SI units

All units listed in this user manual are SI units.

All non-SI units are placed in brackets.

The numbered operating instructions must be carried out in that numerical sequence.

Use and maintenance instructions as supplied by manufacturers of components such as water pump and cardan shaft have been supplied with this user manual. Ask for them if you have not received them.

Homburg Machinehandel b.v. does not accept any liability for damage resulting from information in the use and maintenance instructions written by the manufacturers of these components.

The Homburg Drainage Cleaner type Junior is referred to as "*Machine*" throughout this user manual.

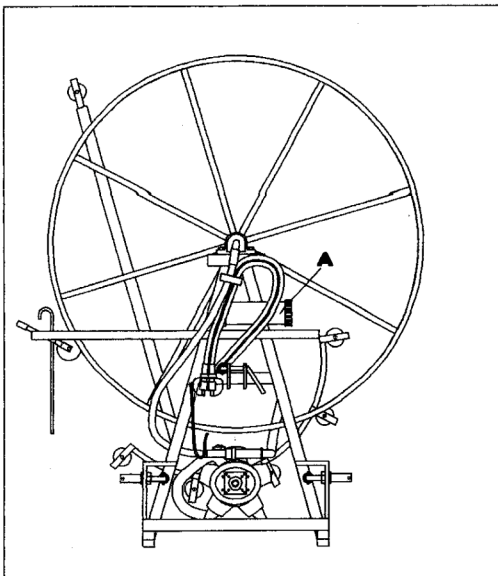
"Feeding in" means: Feeding the flushing hose into the drainpipe.

"Feeding out" means: Feeding out the flushing house from the drainpipe.

Contact Homburg Machinehandel b.v. if you want to know anything about the machine that is not described in this user manual. If you contact us, please make sure you have the following information at hand:

- machine type
- serial number
- year of manufacture
- water pump type

Always keep this user manual on the machine in its special storage compartment see fig. 30A). If the user manual is missing or damaged or if pages are missing, a new copy must be ordered from the manufacturer at once.



30 OPBERGPLAATS GEBRUIKERS HANDLEIDING

The following documents are available for the Homburg Drain Cleaner type Junior:

	<i>Order number:</i>
- User manual incl. parts book	13430 (NL)
	13431 (GB)
	13432 (D)
	13433 (F)
- User manual Walterscheid cardan shafts (supplied)	
- User manual Imovilli Pompe water pumps (supplied)	
- Parts Book Imovilli Pompe water pumps (supplied)	

On the last page you will find a form that you can use to list your suggestions, questions and remarks regarding this user manual. If you think that this user manual needs modifications, please let us now.

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2 INTRODUCTION

The Homburg Drain Cleaner type Junior is exclusively intended for cleaning drainpipes in agricultural land using water. No other use of the machine is permitted. The manufacturer is not liable for damage caused by use that is not described in this user manual. If the machine does have to be used for a different purpose, this requires the prior written permission from the manufacturer.

- * The guide arm must never be used as a hoist.
- * The machine must not be operated by people younger than 18.

The Homburg Drain Cleaner type Junior or some construction designs used in it are patented under the following patent number: **7811818**

3 DECLARATION OF CONFORMITY



CE Declaration of conformity

Manufacturer:

(visiting address)

Homburg Machinehandel b.v.
It Noarderfjild 21
9051 BM Stiens
The Netherlands

(mailing address)

Homburg Machinehandel b.v.
Postbus 5
9050 AA Stiens
The Netherlands

Importer:

declares that the Homburg Drain Cleaner type Junior:

- A. Has been produced in accordance with the requirements of the Machine Directive of 14 June 1989, according to the laws of the member-countries regarding safety of machines (89/392/EEC, amended by the directives 91/368/EEC and 93/368/EEC), with special reference to the first Appendix of the directive regarding the safety and health in relation with construction and production of machines.
- B. Has been produced in accordance with the current standards as stated in article 5 (2) and other relevant regulations.


Stiens, 01 March 2000

Johannes de Boer
Managing Director
HOMBURG MACHINEHANDEL B.V.

4 IDENTIFICATION

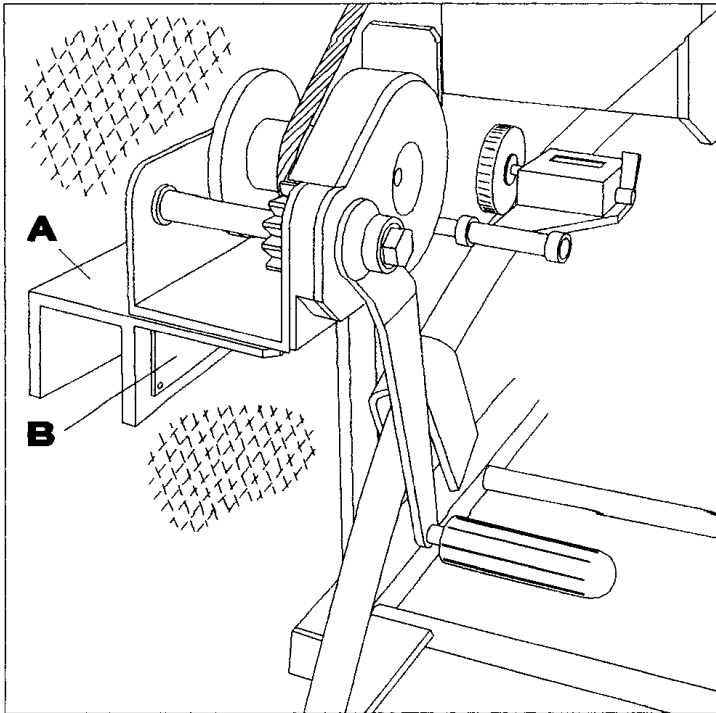
The location of the identification plate (see fig. 13) on the machine is shown in fig. 31B. The following information can be found on the identification plate:

- Name of the manufacturer
- Visiting address of the manufacturer
- Telephone number of the manufacturer
- Fax number of the manufacturer
- e-mail address of the manufacturer
- Company logo
- Machine type reference
- Serial number of the machine
- Year of construction of the machine
- CE mark (indicating that the machine satisfies the Machine Directive)
- Patent number

HOMBURG MACHINEHANDEL B.V. IT NOORDERFJILD 21, 9051 BM STIENS, NEDERLAND TEL. 0031 (0)58 2571555 FAX. 0031 (0)58 2573535 e-mail : homburg@homburg-holland.com	
DRAINCLEANER TYPE :	<input style="width: 150px; height: 20px;" type="text"/>
SERIENUMMER :	<input style="width: 150px; height: 20px;" type="text"/>
BOUWJAAR :	<input style="width: 150px; height: 20px;" type="text"/>
 <small>PATENT.NR. 7811818</small>	

13.TYPEPLAATJE

The machine serial number is also stamped on top of the machine frame close to the identification plate. For the location of this stamped serial number see fig. 31A.



31 LOCATIE SERIENUMMER EN TYPEPLAATJE

On receipt of the machine fig. 13 and the information below must completely be entered:

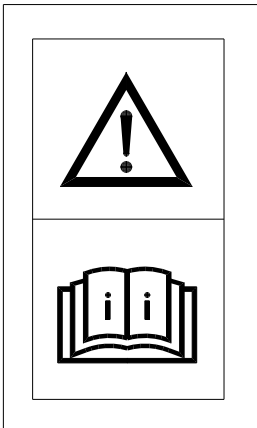
Pump	Make	: Imovilli
	Type	: D135
	Serial no.	: _____
Cardan shaft	Make	: Walterscheid
	Type	: W2100-SD05-660-10100-10100
	Serial no.	: _____
Delivery date	Machine	: _____
Factory stamp		: _____

5 SAFETY

5.1 General

Homburg Machinehandel b.v. does not accept any liability for damage caused by acts in violation of this user manual. If the machine is used in violation of this user manual, that will automatically void the warranty of the machine and the manufacturer's product liability.

The machine may only be used by operating staff or maintenance staff older than 18 who have fully read and understood this user manual and who are familiar with the use of the machine.



07.STICKER"LEES EERST DE GEBRUIKERS HANDLEIDING"

In addition, we recommend to follow a short course in operating and maintaining the machine, which can be arranged by the manufacturer or a different company or importer recognised for that purpose by the manufacturer of the machine.

You, as machine operator or engineer, are the one who determines whether the machine is used in accordance with this user manual.

Always observe the operating manual of the tractor to be used, the cardan shaft and the water pump when using the machine.



DANGER!

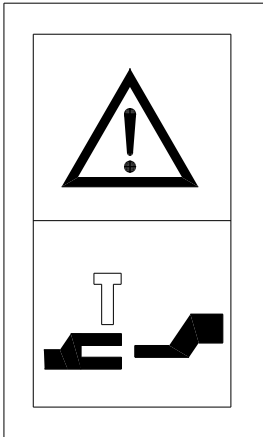
Failure to observe the following safety instructions may result in bodily injury, disability or death.

5.2 Before starting work

- * Warnings or safety provisions or guards on the machine must regularly be checked for presence and performance.
- * The machine must not be used unless it is in perfect technical condition. Do not operate a machine when parts are worn.
- * The machine must only be used with a suitable tractor that is in perfect technical condition.
- * Do not activate the water pump when it can reasonably be expected that the water in the pump is frozen.
- * Make sure there are no children and/or animals near the machine when it is being operated. All people must keep out of the machine's operating range.
- * Always inspect the area where the machine is going to be used (height, width, bearing capacity embankments, shoulders, floors, bridges, risk of explosion etc.).
- * Wear adequate eye protection (goggles). The flushing water leaving the drainpipe under pressure may carry off small hard objects at high speed.
- * Always check the machine for loose bolts and nuts, damage, leakage or defects and correct operation (also the tools and accessories).
- * Check all guards, warnings and safety devices for presence and proper performance.
- * Do not operate the machine when you are tired or have used alcohol, medicines or drugs.
- * Beware of dangerous clothing, long hair or jewellery that may get caught somewhere.
- * Keep the controls free of food, oil, dirt, dust, snow and ice.
- * When the machine is operated at ambient temperatures below zero degrees Celsius, the water pump may get damaged when it is switched on.
- * Use a tractor with safety cab or roll bar as prescribed by the law.

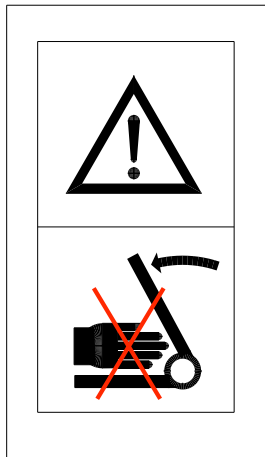
5.3 Hitching and unhitching

- * The machine must only be hitched to the tractor using the three-point suspension intended for that purpose in accordance with the safety requirements.
- * Utmost care must be taken when hitching or unhitching the machine.
- * When hitching or unhitching the machine, the tractor operating lever must be placed in such a position that it cannot inadvertently be moved.
- * Make sure the machine link pin diameters match the hole diameters of the tractor three-point.



16.STICKER"OPHANGPUNT 3-PUNTS OPHANGING"

- * **WARNING:** In the area of the tractor three-point the risk of getting caught and sustaining injury exists.

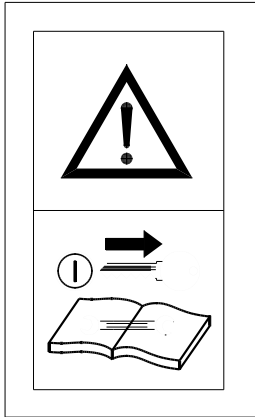


10.STICKER"AFKNELGEVAAR"

- * Lock the stabiliser rods before entering a public road. This will prevent inadvertent lateral movement of the machine.

5.4 Drive (pto and cardan shafts)

- * Only use the universal cardan shaft that came with the machine or the one prescribed by the manufacturer.
- * The pto or cardan shaft protection must always be mounted and in good condition.
- * Make sure the protective sleeve of the universal cardan shaft provides complete protection in working position as well as in transport position.
- * Stop the tractor engine and take out the ignition key before mounting or dismantling the cardan shaft.

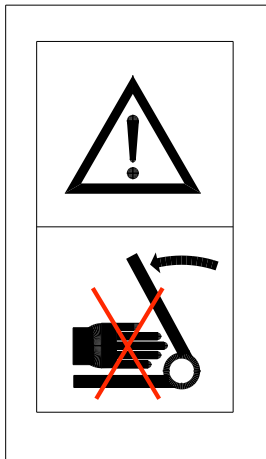


14. STICKER "VERWIJDER CONTACTSLEUTEL VOOR ONDERHOUD"

- * If the cardan shaft is equipped with a slipping clutch or a freewheel clutch, then mount it on the machine side.
- * Always make sure the universal cardan shaft is mounted and locked correctly.
- * Always make sure that the protective sleeve of the universal cardan shaft is locked firmly in the rotating direction with the aid of lock chains.
- * Select the correct rpm for the cardan shaft before switching it on.
- * Check that there are no people or animals near the machine before switching on the cardan shaft.
- * Switch off the cardan shaft when the angle with the machine or the tractor exceeds the value prescribed by the manufacturer.
- * Warning: When the cardan shaft has been switched off, the driven pump may coast down a while. Never touch it while it is coasting down.
- * Place the cardan shaft in the special cardan shaft support when it is not in use. Never let it hang on the lock chain.
- * After uncoupling the universal cardan shaft from the pto, the protective cover must be placed back on the tractor pto.
- * Damaged and/or defective pto and cardan shaft covers must be replaced at once. Only use original replacement parts.
- * Never stand on the cardan shaft or on the protective sleeve of the cardan shaft.
- * Always observe the cardan shaft instruction manual when working with the machine.
- * Make sure the cardan shaft has been shortened in accordance with the instructions to prevent damage to the machine during lifting.

5.5 Working with the machine

- * The guide arm must never be used as a hoist.
- * The machine must not be operated by people younger than 18.
- * Always apply the tractor handbrake before working with the machine or leaving the tractor seat.
- * Always ensure you have sufficient room when using the machine guide arm.
- * Beware of electric cables and lines when working with the guide arm. Touching them can be fatal!
- * Never play games with the machine.
- * Wear adequate eye protection (goggles). The flushing water leaving the drainpipe under pressure may carry off small hard objects at high speed.
- * Only operate the machine from the position intended for it.
- * Only operate the tractor from the position intended for it.
- * Always ensure a good view of the work.
- * Always switch off the machine when you leave it and take the tractor ignition key with you.
- * Warning: In the area of the machine guide arm the risk of getting caught and sustaining injury exists.



10.STICKER"AFKNELGEVAAR"

- * When working from public roads, always keep other road users in mind. Switch on the flashing light or rotating light.
- * The maximum permissible values such as: engine rpm, hydraulic oil pressure and water pressure etc. of the machine must not be exceeded.
- * When the machine is operating, the noise production of the machine is lower than 70 dB(A). Use hearing protection dependent on the noise produced by the tractor.
- * When the machine is operating, the mechanical vibration energy value of the machine is lower than $a_{vhw} 2.5 \text{ m/s}^2$.
- * If a thunderstorm approaches when working on the field, directly sit in the tractor if it has a cab.
- * Never leave the machine when the tractor ignition key is still in the ignition lock.
- * Always observe the operating manual of the tractor used when working with the machine.

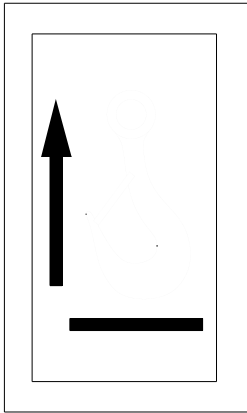
- * Emergency: In the event of a runaway tractor diesel engine due to insufficient maintenance of the air filter or the crankcase ventilation system, the machine and the tractor engine may get severely damaged due to a very high rpm. If this happens, the air intake of the tractor engine must be shut off as quickly as possible to stop the engine.
- * Emergency: If the tractor with the machine has toppled, the tractor engine must be shut off directly to prevent damage to the tractor engine and the machine water pump.
- * The machine must in no event touch the tractor cab or the tractor cab window when it is being lifted.

5.6 *Transport (behind the tractor)*

- * If the tractor with the machine has to use public roads, the assembly must satisfy the current traffic regulations and legislation. When the machine is hitched to the tractor, in many cases the original rear lighting of the tractor is obscured. This means that a correctly functioning light beam must be mounted to the rear of the machine fitted with:
 - * Rear lights
 - * Brake lights
 - * Flasher lights
 - * Licence plate lighting (i.a.)
 - * Licence plate holder (i.a.)
 - * Holder for triangle "Slow traffic"
 - * Red rear fog light (i.a.)
 - * Reflectors
- * Also make sure that the flashing light or rotating light mounted on the tractor is clearly visible for traffic approaching the tractor with machine from the rear. That applies for transport position as well as operating position.
- * Make sure the maximum permissible axle loads and maximum permissible dimensions of tractor and machine are in accordance with the traffic regulations when using public roads.
- * Make sure the machine has been brought into transport position as prescribed by the manufacturer when using public roads with the tractor and machine.
- * It is not permitted to carry people, animals or goods with the machine.
- * Be aware that the tractor handles differently with a hitched machine.
- * Check that the tractor front axle pressure is sufficient before driving off. If not, place ballast weights as prescribed by the tractor manufacturer.
- * Make sure that the maximum permissible axle loads or the axle loads division of the tractor are never exceeded.
- * Allow for the protruding rear length when taking corners and reversing when the machine is hitched to the tractor. Insufficient room when taking corners can cause irreparable damage to the complete machine and the three-point lift.
- * When the machine is transported behind the tractor in its highest position, then lock the operating lever of the three-point lift.
- * Keep in mind that the machine may hit the ground with force when driving over rough terrain with the tractor. That may cause severe damage to both the three-point and the machine itself.
- * Switch off all working lights when driving over public roads.

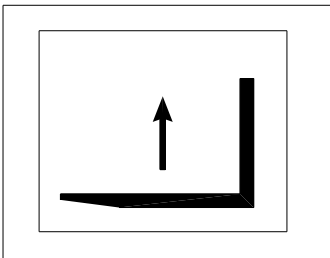
5.7 *Transport (not behind the tractor)*

- * Be aware of the total transport height (flyovers etc.).
- * Be aware of the total transport weight.
- * Never stand under a lifted machine.
- * Only use the special hoisting eyes when the machine has to be hoisted.



08.STICKER"HIJSPUNT"

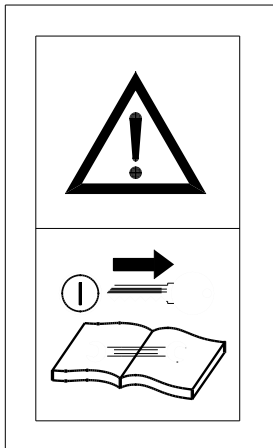
- * Only lift the machine at those places indicated with the sticker below.



12.STICKER"HEFTRUCK OPPAKPUNT"

5.8 Service, maintenance and repair

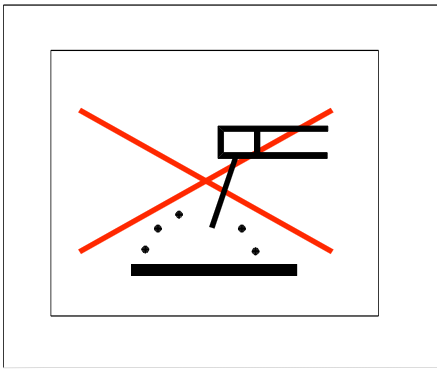
- * Maintenance and repairs must only be carried out by trained, appointed and authorised personnel that does not use alcohol, medicines or drugs.
- * Operators are only allowed to carry out the maintenance and repair described in this user manual.
- * The settings and accesses sealed by the manufacturer must not be broken.
- * A broken seal automatically voids the manufacturer's product liability.
- * Always use the tools, spare parts, materials, lubricants and operating procedures prescribed by the manufacturer.
- * Never use defective tools.
- * Use tools only for their intended purpose.
- * Don't leave any tools in the machine after maintenance.
- * Make sure during maintenance and repairs on the machine that the ignition key has been removed from the lock and that the cardan shaft is uncoupled.



14. STICKER "VERWIJDER CONTACTSLEUTEL VOOR ONDERHOUD"

- * Beware of exhaust gases in confined spaces, risk of carbon monoxide poisoning!!

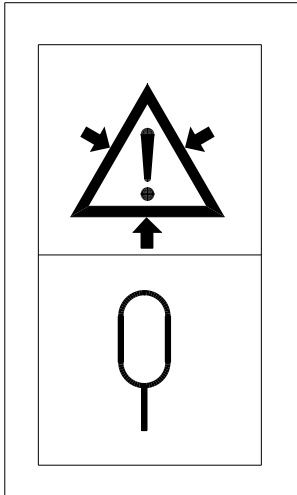
- * Never weld on the machine without the manufacturer's written permission.



11. STICKER "NIET LASSEN AAN DE MACHINE"

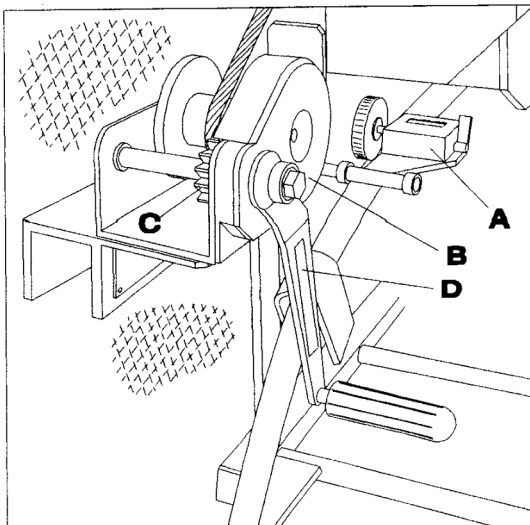
- * Unhitch the machine from the tractor before welding on the machine.
- * Place suitable supports under the machine when carrying out maintenance with the machine in lifted position.
- * Never unfold the guide arm when the machine is not hitched to the tractor. The machine may topple if you do.
- * Always observe the safety precautions from suppliers of battery acid, fuels, lubricants, cooling fluid and hydraulic oil.
- * Deposit used oil, used grease and oil filters at the intended places in accordance with environmental regulations.
- * None of the substances on or in the machine are suitable for internal use.
- * Uncouple the battery or the electric connection to the tractor when working on the electric system of the machine.
- * Never remove lines, hoses or valves of hot and/or pressurised fluids.
- * Never remove a protective casing of an operating machine.
- * Never modify the machine without the manufacturer's written permission. Modifying also includes: removing parts, breaking seals for instance on the pump, the hydraulic valves control block and water pressure controller, or adding parts or equipment on or to the machine that are not described in the user manual.

- * The machine has a water pump equipped with a pressurised air-filled accumulator. Be very careful when working on this accumulator. Work must only be carried out by specialised personnel with special tools.

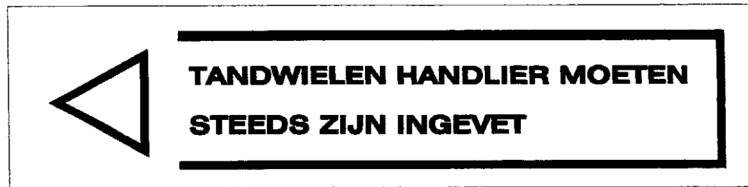


09.STICKER"ACCUMULATOR AANWEZIG"

- * Make sure the gears of the self-locking hand winch are always coated with grease (see fig. 40C and fig. 44).



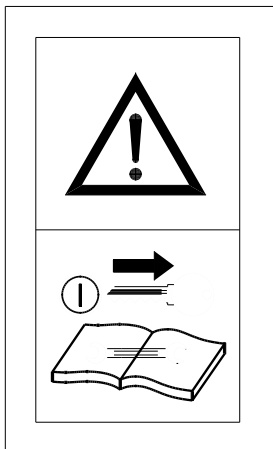
40 ZELFREMMENDE HANDLIER EN METERTELLER



44 STICKER "TANDWIELEN HANDLIER MOETEN STEEDS ZIJN INGEVET"

5.9 Hydraulic system

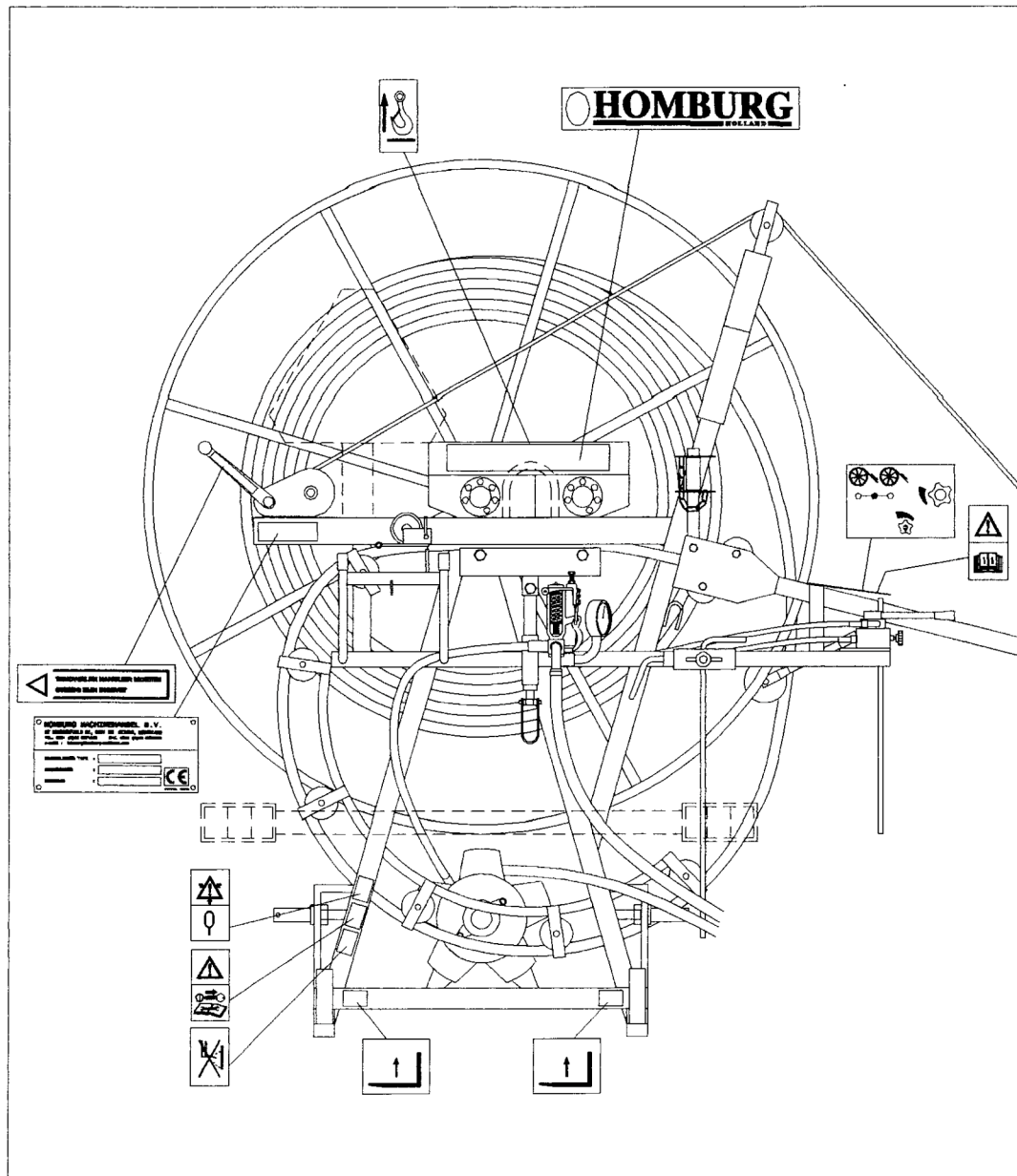
- * **Warning:** The hydraulic system is pressurised. Hydraulic oil under pressure may cause serious injury when it touches the skin. Directly consult a physician if that happens, because there is a risk of infection.
- * First switch off the hydraulic control valve of the tractor, then move the control lever of the machine back and forth a number of times before connecting the hydraulic quick-connect couplings of the machine to the tractor.
- * Mark the quick-connect couplings of the tractor as well as those of the machine to prevent incorrect connection of the quick-connect couplings. If the quick-connect couplings have been connected incorrectly, all hydraulic operating functions are reversed (e.g. up becomes down).
- * Work on the hydraulic system must only be carried out by personnel with special training.
- * Regularly check the hoses. Damaged and/or defective hoses must be replaced at once. When mounting new hoses, these must satisfy the specifications prescribed by the manufacturer.
- * If the hydraulic system has a leak, all necessary precautions must be taken to prevent accidents and/or damage to the environment.
- * Lower the machine to the ground, switch off the tractor engine, take the ignition key from the lock and move all hydraulic operating levers back and forth a number of times to take the pressure from the hydraulic system before carrying out work on the hydraulic system.



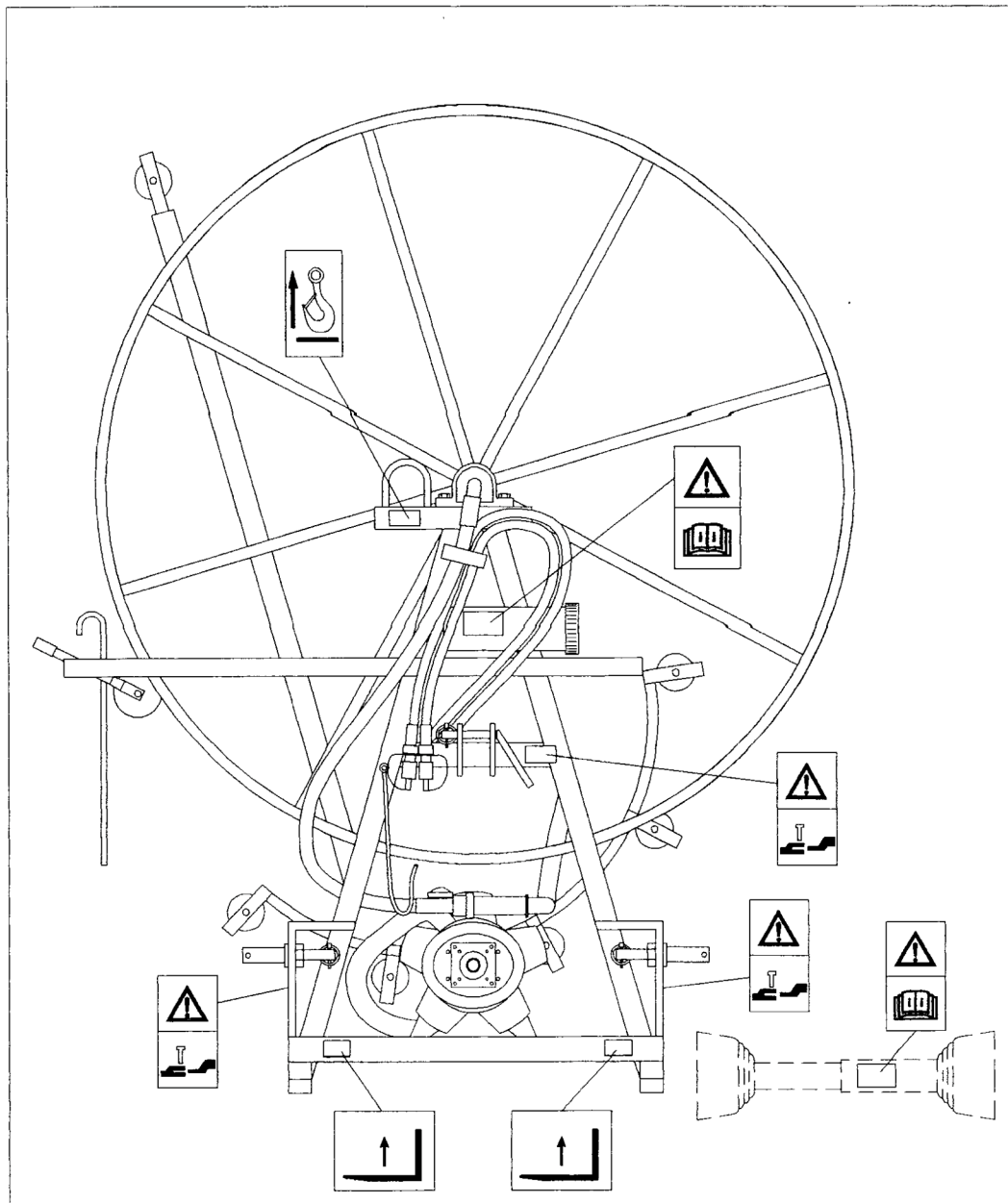
14. STICKER "VERWIJDER CONTACTSLEUTEL VOOR ONDERHOUD"

5.10 Safety warnings (stickers) fig. 32 + 33:

- * Warnings on the machine must be durable, indelible, and permanently present on the machine throughout the machine's service life. If the warnings have been removed or have become illegible, they must be replaced at once. The meaning of all stickers has been described in the above text. Below it is shown where all warnings should be on the machine.



32 LOCATIE STICKERS ACHTERZIJDE



33 LOCATIE STICKERS VOORZIJDE

Order numbers stickers:

Warning:

"Read the operating manual first"

"Hydraulic operating symbols"

"Hoisting point"

"Three-point suspension point"

"Forklift pick-up point"

"Air accumulator present in machine"

"Danger of getting caught"

"No welding on the machine"

"Remove tractor ignition key before carrying out maintenance"

"Homburg manufacturer's sticker"

"Always keep hand winch gears coated with grease"

Order number:

(art. no.978443)

(art. no.13142)

(art. no.978439)

(art. no.978446)

(art. no.13410)

(art. no.13411)

(art. no.978434)

(art. no.13412)

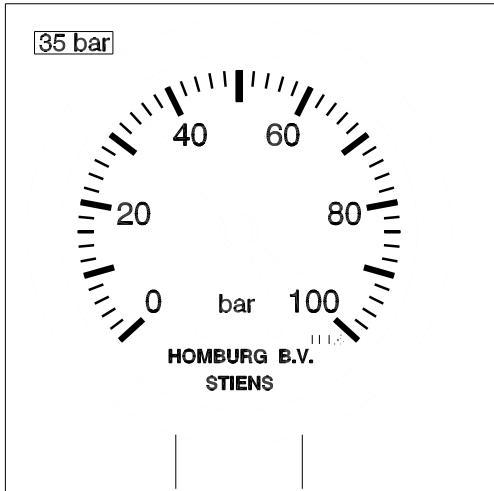
(art. no.978436)

(art. no.13413)

(art. no.13414)

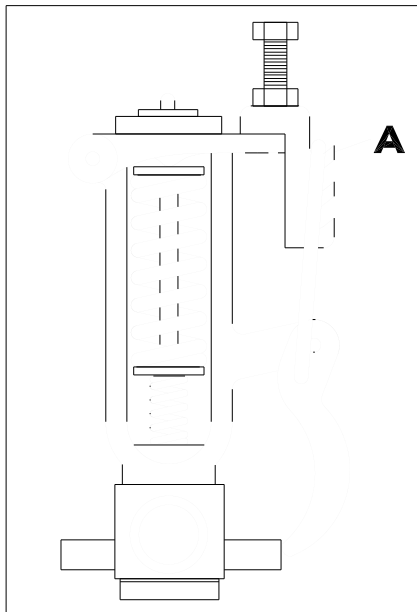
5.11 Safety provisions:

- A. Stickers (see fig. 32 and 33).
- B. Pressure gauge. Indicates the flushing water pump pressure in bar (see fig. 18 and fig. 34 pt. 21).



18 SPOELWATERDRUKMETER

- C. Safety mesh in reel. Prevents limbs from getting caught in the rotating reel (see fig. 34 pt. 09).
- D. Flushing water pressure controller. Prevents the pressure from exceeding 3.5MPa (35 bar) (see fig. 05 and fig. 34 pt. 20).



05 SPOELWATERDRUK REGELAAR

- E. Protective cover reel drive. Prevents limbs from getting caught in the drive (see fig. 34 pt. 17).
- F. Protective cover drive rubber wheels. Prevents limbs from getting caught in the drive (see fig. 34 pt. 17).
- G. Protective sleeve cardan shaft. Prevents limbs from getting caught in the rotating cardan shaft (see fig. 35 pt.10).
- H. Support cardan shaft. Prevents damage to the cardan shaft or its protective sleeve (see fig. 35 pt. 05).
- K. User Manual (see "Preface" and fig. 35 pt.10).
- L. Lighting beam for use on public roads. Prevents traffic accidents (see fig. 34 pt. 47).
- M. Triangle "slow traffic". Prevents traffic accidents (see fig. 34 pt. 12).



WARNING!

Never remove or deactivate safety provisions. Any defective safety provision must directly be repaired in a correct manner. Never use the machine with one of the safety provisions removed, defective or deactivated.

6 GENERAL DESCRIPTION OF THE MACHINE

6.1 *Main components*

The Homburg Drain Cleaner type Junior is a machine for cleaning drainage systems as found in agricultural land using water when they have got clogged up, for instance with clay silt.

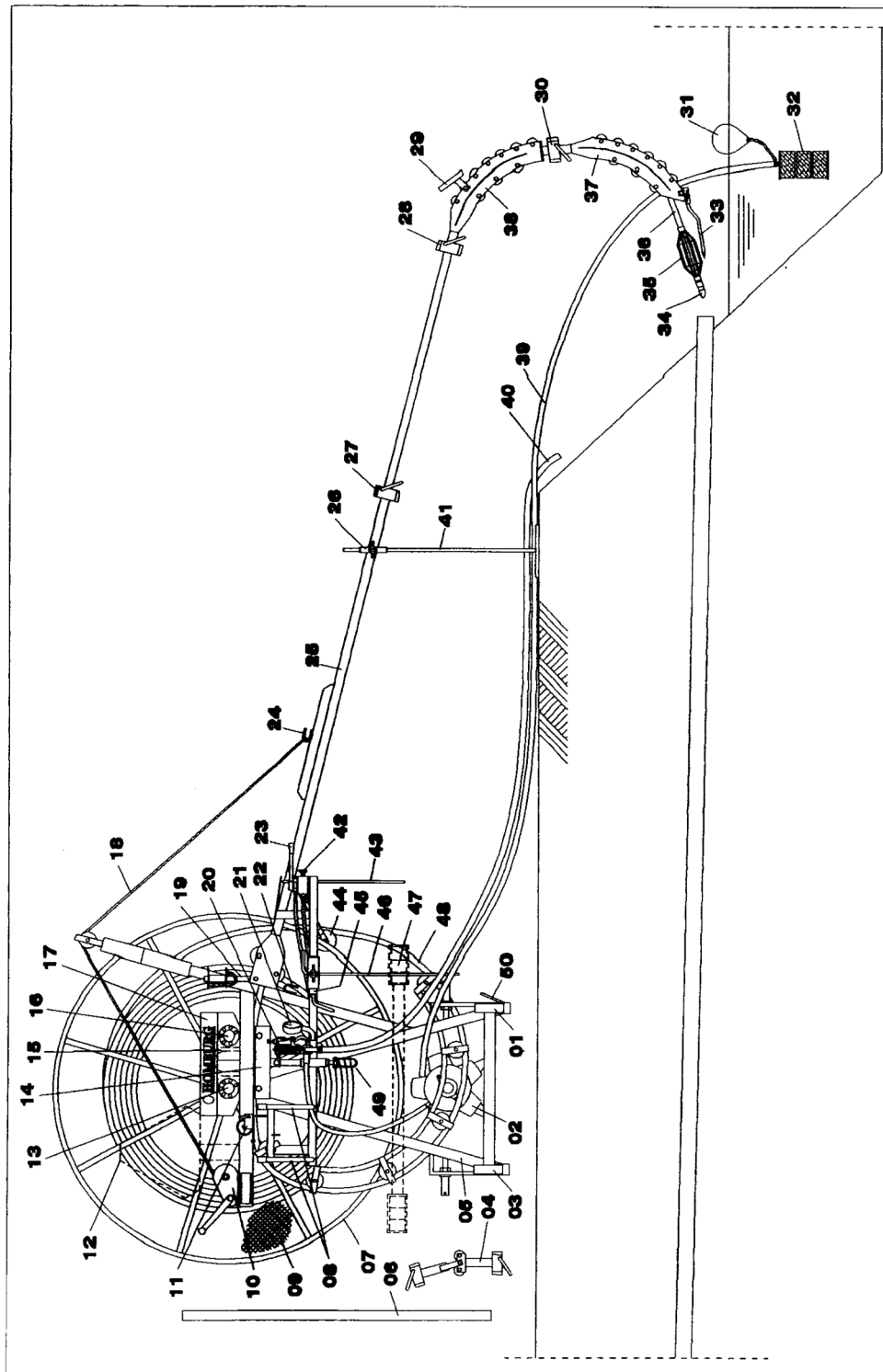
The machine can only operate when it is directly connected to a suitable agricultural tractor using:

- * Three-point suspension
- * Cardan shaft
- * Hydraulic hoses (2) with quick-connect couplings
- * Electric connection for rear lighting and/or working lights.

The main components of this machine are (see fig. 34) rear:

01. Transport support top guide arm and bottom guide arm
02. Flushing water pump
03. Transport support bottom roller bend and knee 30° wells set (option)
04. Knee 30° wells set (option)
05. Steel frame
06. Telescopic pipe 2 metres for wells set (also fits between pos. 27 and pos. 28)
07. Reel
08. Suspension bracket suction hose, overflow hose, float and suction basket
09. Safety mesh
10. Self-locking hand winch
11. Metres counter
12. Triangle "Slow traffic" (option)
13. Hydraulic motor reel drive
14. Pressure rolls flushing water hose
15. Hoisting eye rear
16. Hydraulic motor flushing hose drive
17. Protective cover flushing hose drive
18. Steel cable
19. Suspension pin
20. Flushing water pressure controller
21. Pressure gauge flushing water pressure
22. Suspension hook steel cable
23. Hydraulic operating lever
24. Fixation hook steel cable
25. Top half guide arm
26. Locking clamp support leg
27. Locking clamp guide arm
28. Locking clamp top roller bend
29. Cleaning tube
30. Locking clamp bottom roller bend
31. Float
32. Suction basket

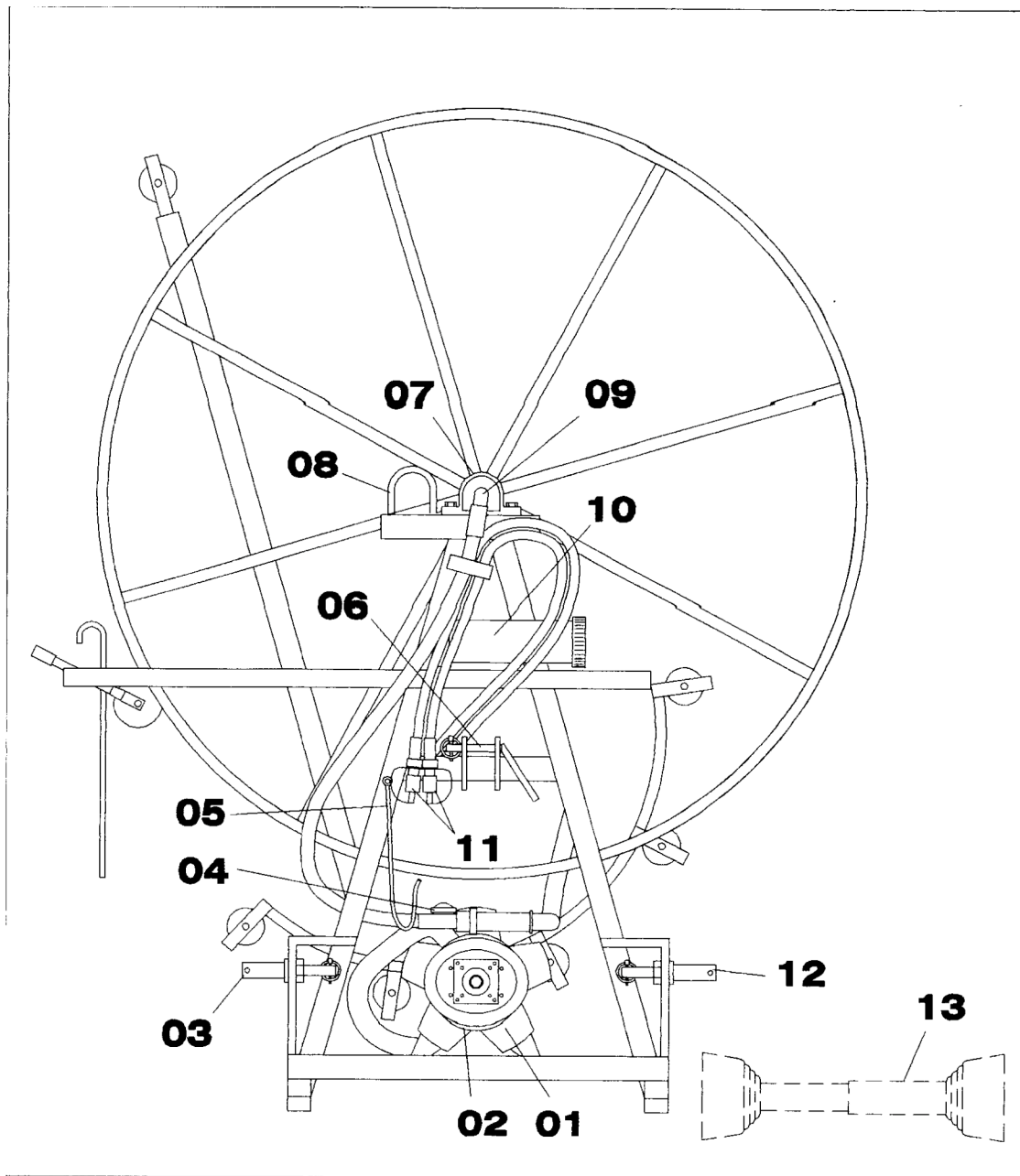
- 33. Fixing pin small
- 34. End piece with nozzle
- 35. Guide basket (option)
- 36. Flushing hose
- 37. Roller bend - bottom
- 38. Roller bend - top
- 39. Suction hose
- 40. Overflow hose
- 41. Support leg
- 42. Pressure compensation valve
- 43. Pin top stop guide arm
- 44. Manually operated flushing hose guide
- 45. Transport clamps top and bottom guide arm
- 46. Fixing pin
- 47. Rear lighting beam (option)
- 48. Flushing hose
- 49. Adjusting lever pressure rolls
- 50. Transport support guide tube wells set (option)



34 HOOFDCOMPONENTEN ACHTERZIJDE JUNIOR

Main components (see fig. 35) front:

01. Flushing water pump
02. Protective cover flushing water pump shaft
03. Suspension point three-point suspension
04. Oil gauge glass/filler cap flushing water pump
05. Cardan shaft support
06. Suspension point three-point suspension
07. Reel bearing
08. Hoisting eye front
09. Water coupling
10. Storage compartment user manual
11. Hydraulic quick-connect couplings
12. Suspension point three-point suspension
13. Cardan shaft



35 HOOFDCOMPONENTEN VOORZIJDJE JUNIOR

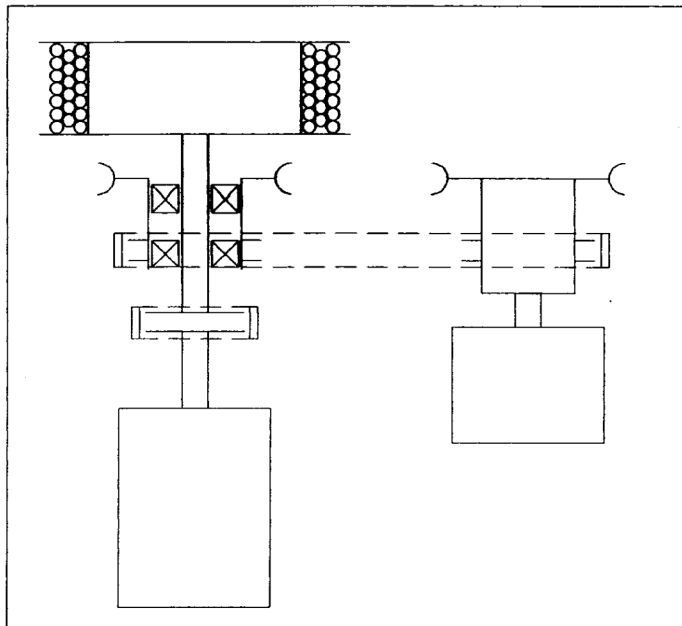
6.2 Operation

The tractor pto drives the diaphragm water pump. Through the suction basket and the suction hose water is sucked in from a ditch or a water tanker. Then the water is sent through a pressure controller (the excess pressure is sent back through an overflow hose to the ditch or the water tanker) and then through the rotating centre of the flushing hose reel, after which it sprays out of the nozzle and performs its cleaning action in the drainpipe. The flushing hose runs from the reel with the drive mechanism through the guide arm and roller bend into the drainpipe.

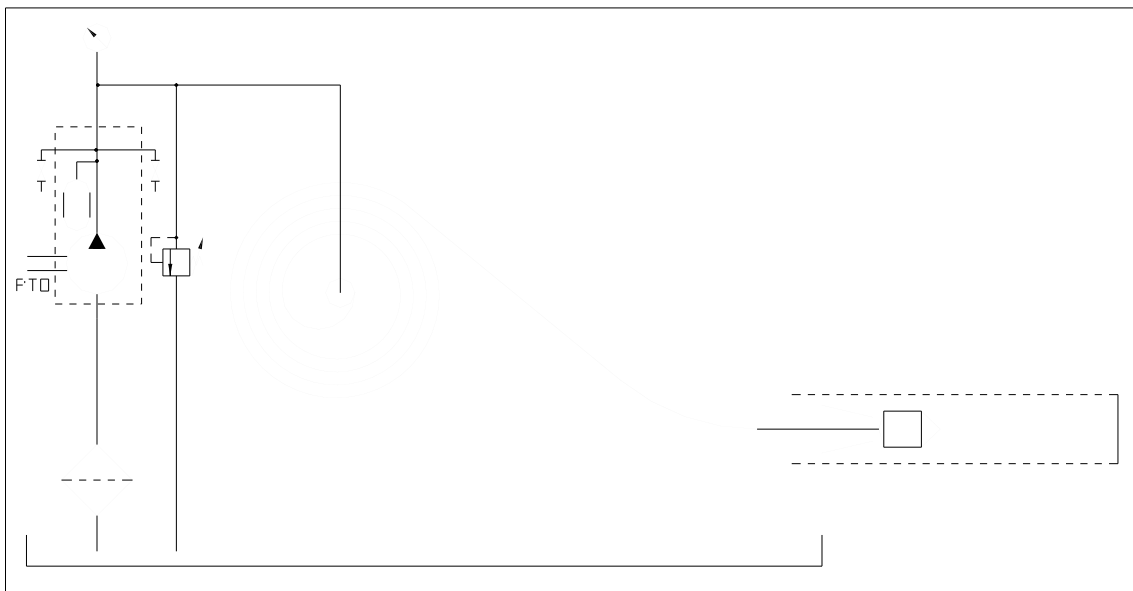
See diagram fig. 03.

The guide arm can be adjusted around its horizontal centre line using a self-locking hand winch. The guide arm can also be manually adjusted a little around a vertical line. The flushing hose can be fed through the guide arm and the roller bends with the aid of 2 rubber wheels driven by a hydraulic motor that are clamped around the flushing hose. The hydraulic system is designed in such a manner that both during feeding in and feeding out the reel wants to roll up under slight pressure, so the flushing hose always winds tightly around the reel. The second section of the roller bend can be turned to enable cleaning drainpipes in the own bank as well as in the opposite bank. See diagram fig. 28.

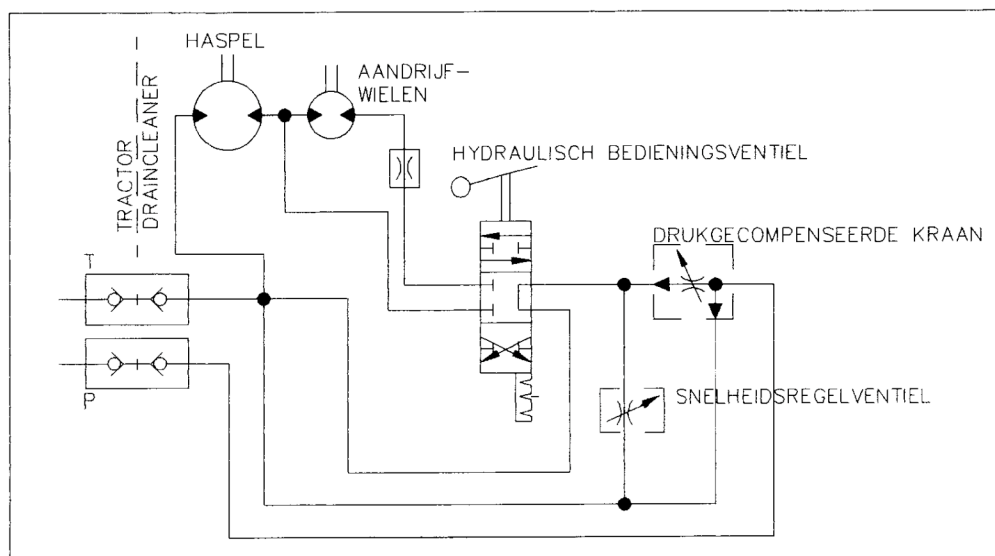
The hydraulic system of the machine features a pressure compensation valve that sends the excess oil from the tractor directly back to the hydraulic reservoir of the tractor. That reduces the heat generation of the hydraulic oil. See diagram fig. 28.



43 SCHEMA AANDRIJVING MECHANISCH



03 WATERSHEMA SPOELSYTEEM DELTA



28 HYDRAULISCH SCHEMA JUNIOR

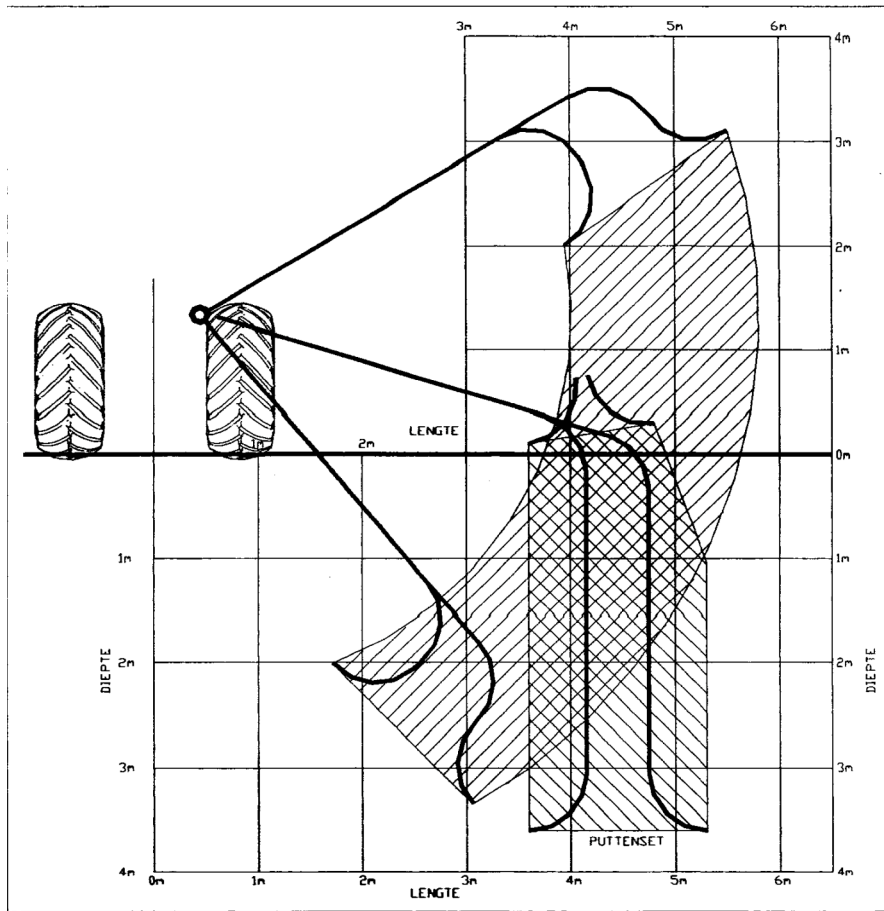
The front of the machine is the side facing the tractor. The guide arm can only be unfolded to the right of the machine. That means the drainpipes to be cleaned must always be kept to the right of the tractor and the machine.

In areas without ditches in which the drainpipes end, they end in concrete wells. Then the machine must be equipped with an optional wells set. This wells set is composed of a 2 metres long pipe and a 30° knee that are mounted between the top and bottom roller bends.

7 TECHNICAL SPECIFICATIONS

7.1 Machine

Make	:	Homburg
Type	:	Junior JU-M135
Length	:	1.10 m
Width	:	1.85 m (arm in transport position)
	:	5.80 m (arm in operating position with roller bend)
Height	:	2.75 m (arm in transport position and standing on the ground and 1 roller bend placed on the arm)
Mass empty	:	385 kg
Mass with water	:	500 kg
Material flushing hose	:	HPE (Hard PolyEthylene)
Length flushing hose	:	300 m
Diameter flushing hose	:	27 mm
Wall thickness flushing hose	:	3.3 mm
Drive flushing hose	:	hydraulic
Operating speed	:	20 m/min. (max.)
Water pressure controller	:	2.5-3.5 MPa (25-35 bar)
Water pressure at the nozzle	:	1.0-1.5 MPa (10-15 bar)
Nozzle	:	12 + 1 hole Ø 2 mm
Length suction hose	:	10 m with suction basket and float
Diameter suction hose	:	38 mm
Mesh size suction basket	:	1.2 mm
Length overflow hose	:	10 m
Paint	:	RAL2004
Hydraulic system	:	2 hydraulic gear motors
	:	1 double-acting cylinder
	:	1-part operating valves block
	:	1 Speed control valve
	:	1 Pressure compensation valve
Noise level	:	< 70 dB(A)
Mechanic vibrations	:	a_{vhw} 2.5 m/s ²
Wells set (option)	:	Knee 30°, Extension tube length 2 m.
Arc angle roller bends	:	60°
Operating range machine	:	
guide arm horizontal	:	10°
Operating range machine	:	(see fig. 36)



36 WERKBEREIK JUNIOR

7.2 Cardan shaft

Make	:	Walterscheid
Type	:	W2100-SD05-660-10100-10100 (14kW 19hp)
Maximum permissible cardan shaft angle measured from the centre line of the pto	:	25°

7.3 Flushing water pump

Make	:	Imovilli Pompe
Type	:	M135
Drive	:	pto, universal cardan shaft
Capacity	:	115 l/min 5MPa (50 bar) (max.) at 540 rpm.
Capacity	:	70-80 l/min 3MPa (30 bar) (nominal) at 400 rpm.
Pressure accumulator	:	0.7 MPa (7 bar)
Speed	:	350-550 rpm
Input power	:	13.3 kW (18hp)
Mass	:	27.5 kg
Lubricating oil	:	1.85 litres (SAE20/30)
Maximum head	:	3 m

7.4 Technical requirements tractor

Tractor must be fitted with:

- * three-point suspension Category 2 in accordance with DIN9674 and ISO730
- * sufficient counterweight
- * pto connection 350-550 rpm. 1³/₈" 6 splines according to DIN9611 and ISO500
- * hydraulic supply 15 l/min 15MPa (150 bar)
- * hydraulic quick-connect couplings 1¹/₂" -bi SAE according to ISO7241-1 Series A or ISO-5675 or SAE1036
- * electric connection rear/working lighting according to DIN72577
- * loose rear lighting beam according to traffic regulations 1994

7.5 Permissible operating conditions of the machine

Ambient temperature 0 °C to 50 °C

Humidity from 10% to 90%

Indoors as well as outdoors environment without dust and/or gas explosion risk.

7.6 Conversion table

SI units	ANSI units	ANSI units	SI units
1 kg	2.2046 lbs	1 lb	0.453592 kg
1 m	3.28 ft	1 ft	0.3048m
1 mm	0.03937 in	1 in	25.4mm
1 km	0.62 mile	1 mile	1.609 km
1 litre	0.264 gallon (US)	1 gallon (US)	3.785 litres
1 MPa (=10 bar)	145 psi (=145 lbs)	1 psi (=1 lbs)	0.068966 MPa (0.0689 bar)
1 kW	1.36 hp	1 hp	0.736 kW
°C	0.555 x (°F - 32)	°F	(1.8 x °C) + 32

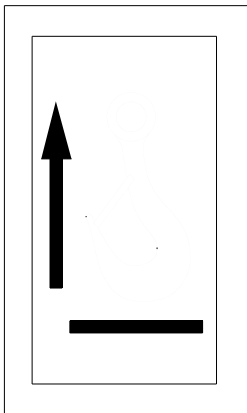
8 TRANSPORT (NOT BEHIND THE TRACTOR)

The machine always comes completely assembled. That means the machine does not have to be put together after receipt. The machine is fitted with 2 hoisting eyes (see fig. 34 pt. 15 and fig. 35 pt. 08). Make sure the reel is not pressed in by slings or hoisting cables when hoisting it! That can be achieved by using an equator.



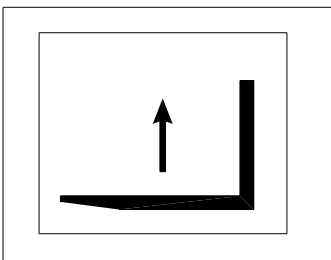
WARNING!

Only hoist the machine on the hoisting eyes.



08.STICKER"HIJSPUNT"

A forklift may only pick up the machine under the lower horizontal beams of the basic frame. Prevent toppling when transporting by forklift.

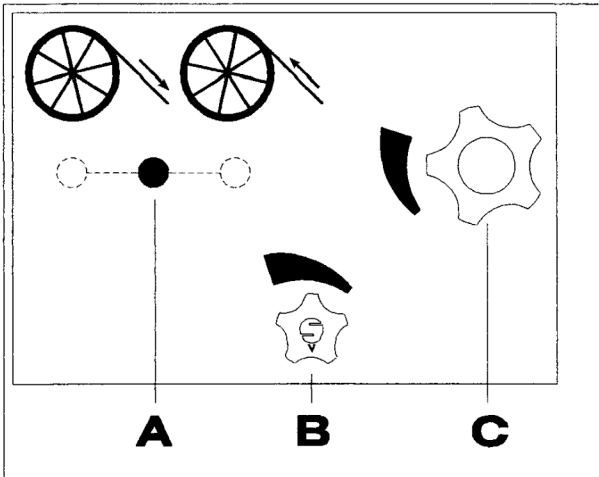


12.STICKER"HEFTRUCK OPPAKPUNT"

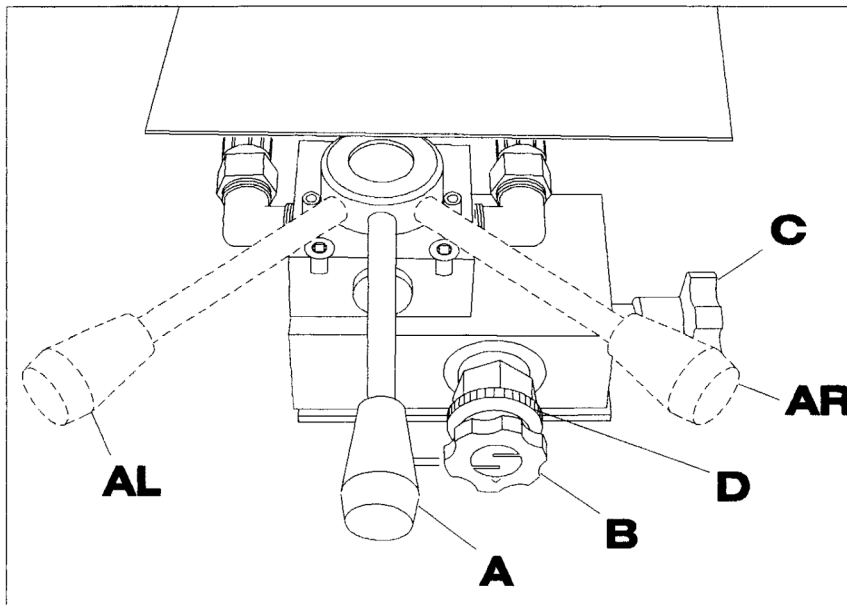
The machine may only be fastened on the beams of the basic frame using lashings and tensioners (for instance in a container and on a lorry deck) to prevent toppling during transport.

Otherwise machine parts may get damaged.

9 CONTROLS



37 STICKER BEDIENINGS-SYMBOLEN HYDRAULISCHE FUNCTIES



38 HYDRAULISCHE BEDIENINGS-ORGANEN

A. Hydraulic operating lever feeding in/out flushing hose (see fig. 37 and 38)
(3 stops)

- * Put the lever to the left to feed in the flushing hose.
- * Put the lever in central position to stop feeding in or out.
- * Put the lever to the right to feed out the flushing hose.

B. Pressure compensation valve (see fig. 37 and 38)

- * Rotate the control anticlockwise to feed more oil to the system (open).
- * Rotate the control clockwise to feed less oil to the system (close).

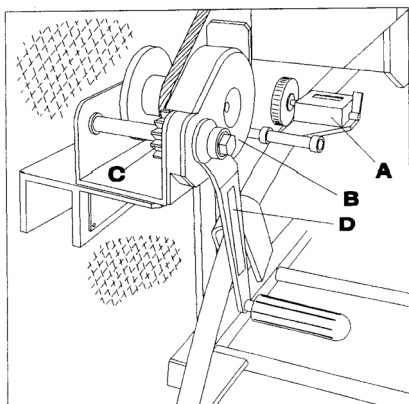
Setting pressure compensation valve B:

1. Feed the flushing hose some 50 m into the drainpipe.
2. Fully close speed control valve C (fully clockwise).
3. Feed the flushing hose out of the drainpipe at 30 m/min using the pressure compensation valve B. Read from the metres counter how many metres a minute are being fed out.
4. Now the pressure compensation valve has been adjusted for the tractor that is now driving the machine. This must be done after once for every tractor so you don't have to touch it anymore. When a different tractor is used, this adjustment must be made again. The hydraulic supply must now be equal to or greater than 15 l/min. After adjusting the valve, it must be locked with locking ring D.

C. Speed control valve feeding in/out flushing hose (see fig. 37 and 38)

- * Rotate the control anticlockwise to decrease the speed (open).
- * Rotate the control clockwise to increase the speed (close).

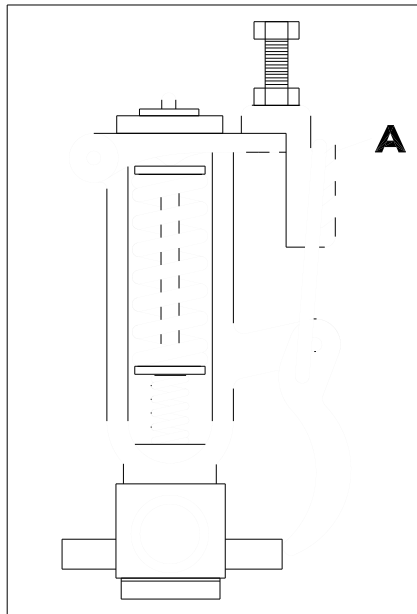
D. Self-locking hand winch (see fig. 40B) for moving the guide arm up and down)



40 ZELFREMMENDE HANDLIER EN METERTELLER

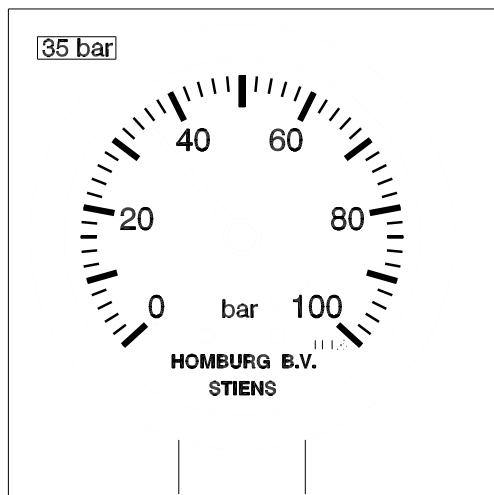
E. Flushing water pressure controller (see fig. 05)
(Screw setting is factory-sealed at 3.5 MPa (35 bar))

- * Always use the top hook **A**



05 SPOELWATERDRUK REGELAAR

- F. Pressure gauge (flushing water)
- * Used to read out the water pump pressure.



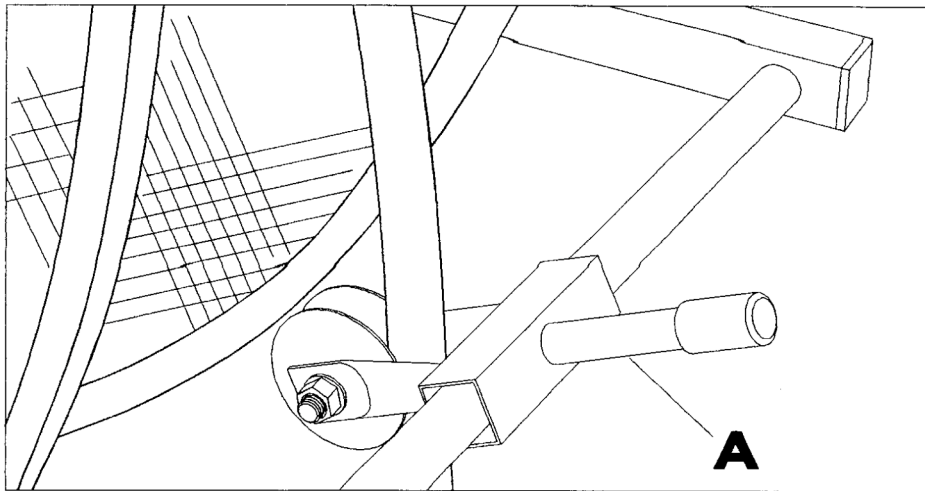
18 SPOELWATERDRUKMETER

Adjusting lever pressure roll flushing hose (see fig. 34 pt. 49)

- * Rotate lever anticlockwise to decrease the pressure on the feeding in/out rolls of the flushing hose.
- * Rotate lever clockwise to increase the pressure on the feeding in/out rolls of the flushing hose.

Flushing hose guide (see fig. 39A)

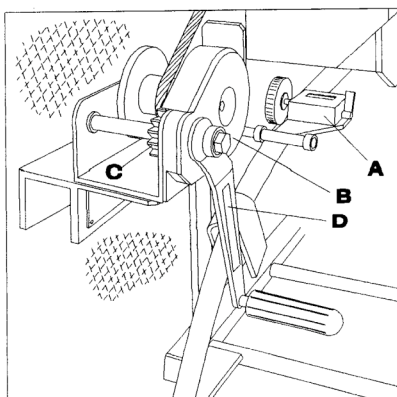
- * Used to guide the flushing hose during reeling in (can manually be shifted horizontally).



39 SPOELSLANG-GELEIDER

Metres counter (see fig. 40A)

- * Displays the length of the flushing hose that has been fed out (can be reset).



40 ZELFREMMENDE HANDLIER EN METERTELLER

Cleaning tube (see fig. 34 pt. 29)

- * This can be used to clean the flushing hose when reeling it in, when the overflow hose is connected to it. Increase the tractor rpm to get a higher bypass flow rate.

Fixing pin (see fig. 34 pt. 46 and pt. 33)

- * This can be used to fix the roller bend before the drainpipe outflow when feeding in/out the flushing hose.

Fixed hook guide arm (see fig. 34 pt. 24)

- * Used to hook on the steel cable to adjust the guide arm height.

Locking clamp (see fig. 34 pt. 27, 28 and 30)

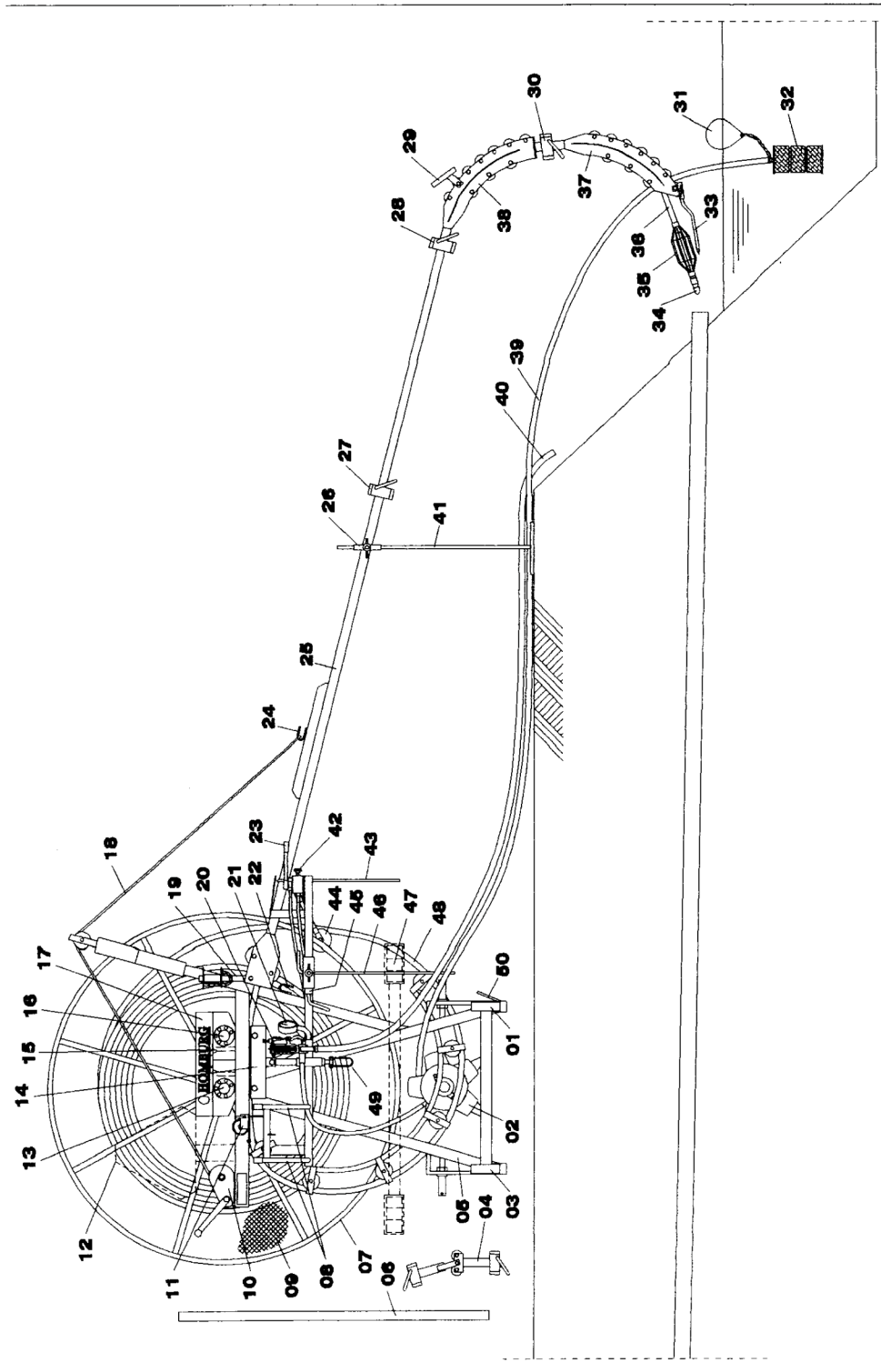
- * A locking clamp has been welded on the base frame, on every roller bend, on the wells set and on the end of the guide arm.

Rpm counter pto (on tractor)

- * Displays the water pump rpm of the machine.

Manual throttle (on tractor)

- * Used to set the water pump rpm of the machine.



34 HOOFDCOMPONENTEN ACHTERZIJDE JUNIOR

10 OPERATING INSTRUCTIONS

10.1 Daily inspection list

Every day the checklist below must be completed before starting work with the machine. The list is used to check correct and safe operation of the machine. Copy this list so it can be entered every day. The fully completed lists can be stored in a folder that can be used as technical record for the machine.

Check carried out by : _____

Date check : _____

Time start check : _____

Check:	OK	Not OK
General damage and leakage machine	<input type="checkbox"/>	<input type="checkbox"/>
Presence and operations safety provisions:		
Stickers	<input type="checkbox"/>	<input type="checkbox"/>
Pressure gauge	<input type="checkbox"/>	<input type="checkbox"/>
Safety mesh in reel	<input type="checkbox"/>	<input type="checkbox"/>
Water pressure controller	<input type="checkbox"/>	<input type="checkbox"/>
Protective cover drive rubber wheels	<input type="checkbox"/>	<input type="checkbox"/>
Protective sleeve cardan shaft	<input type="checkbox"/>	<input type="checkbox"/>
Support cardan shaft	<input type="checkbox"/>	<input type="checkbox"/>
User manual	<input type="checkbox"/>	<input type="checkbox"/>
Lighting beam for use on public roads	<input type="checkbox"/>	<input type="checkbox"/>
Triangle slow traffic for use on public roads	<input type="checkbox"/>	<input type="checkbox"/>



WARNING!

Never remove or deactivate safety provisions. Any defective safety provision must directly be repaired in a correct manner. Never use the machine with one of the safety provisions removed, defective or deactivated.

Check:	OK	Not OK
Water pump:		
Oil level	<input type="checkbox"/>	<input type="checkbox"/>
Accumulator pressure 7 bar (check and correct with air compressor and pressure gauge if necessary!)	<input type="checkbox"/>	<input type="checkbox"/>
Presence suction basket	<input type="checkbox"/>	<input type="checkbox"/>
Presence float	<input type="checkbox"/>	<input type="checkbox"/>
Check that the two shut-off valves are closed	<input type="checkbox"/>	<input type="checkbox"/>
Presence and operation of:		
Top half guide arm	<input type="checkbox"/>	<input type="checkbox"/>
Bottom half guide arm	<input type="checkbox"/>	<input type="checkbox"/>
Support leg	<input type="checkbox"/>	<input type="checkbox"/>
Roller bends (2)	<input type="checkbox"/>	<input type="checkbox"/>
Wells set pipe (option)	<input type="checkbox"/>	<input type="checkbox"/>
Wells set knee 30° (option)	<input type="checkbox"/>	<input type="checkbox"/>
Suction hose	<input type="checkbox"/>	<input type="checkbox"/>
Suction basket	<input type="checkbox"/>	<input type="checkbox"/>
Float	<input type="checkbox"/>	<input type="checkbox"/>
Overflow hose	<input type="checkbox"/>	<input type="checkbox"/>
End piece	<input type="checkbox"/>	<input type="checkbox"/>
Nozzle	<input type="checkbox"/>	<input type="checkbox"/>
Centring basket (option)	<input type="checkbox"/>	<input type="checkbox"/>
Cardan shaft	<input type="checkbox"/>	<input type="checkbox"/>
Fixing pin	<input type="checkbox"/>	<input type="checkbox"/>

Be sure to get information showing where exactly the drainpipes are and how long all drainpipes of the system to be cleaned are. (For instance drawings, obtained from your superior or the client.)

10.2 *Cleaning drainpipes: When and how often?*

When to clean the drainpipes depends on the weather conditions, soil type and soil structure, on the diameter, type and condition of the drainpipe, and on how accurate the pipe lies in the ground. The following test that should be carried out in or after a wet period with a lot of rain, preferably in autumn, provides a guideline.

01. Find a drainpipe in the edge of the ditch.
02. Collect the water in a one litre graduated beaker.
03. Measure how many seconds (T) it takes to collect one litre.
04. Fill out the following formula:

$$\frac{86400}{(L \times A \times T)} = M$$

- L = Length drainpipe (metres)
 A = Drainpipe spacing in (metres)
 T = Measured time (seconds)
 M = Number of millimetres discharged per day

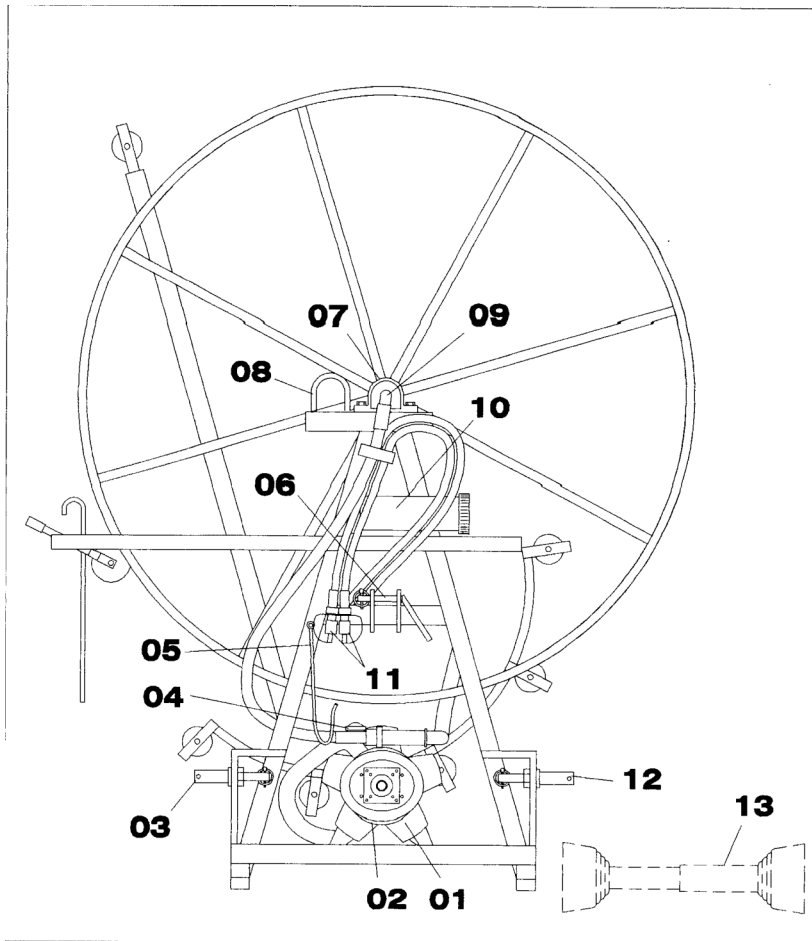
For grass land, maize land and arable land this discharge must be 7 millimetres. (Note, this applies to drainpipes with single-sided discharge). If it is less, it must first be checked whether the drainpipes are situated correctly. If they are, the drainpipes must be cleaned. Do this for a number of drainpipes in the field, to determine an average.

It is recommended to clean the drainpipes during a wet period when the drainpipes are already discharging water. For more detailed agricultural knowledge and recommendations on the use and maintenance of drainpipes you should consult the relevant institutions and/or literature. Agricultural science is not within the scope of this user manual.

10.3 Taking into operation

10.3.1 Hitching the machine to the tractor

01. Observe all safety instructions as described in the safety chapter of this user manual.
02. If necessary, equip the tractor with sufficient front weights.
03. Make sure the machine is on a level surface.
04. If necessary, place guide shells on the lower link pins of the machine (see fig. 35 pt. 03 and pt. 12).
05. Couple the lower lift arms of the three-point to the lower link pins of the machine (see fig. 35 pt. 03 and pt. 12).
06. Lock the lower lift arms.



35 HOOFDCOMPONENTEN VOORZIJDJE JUNIOR

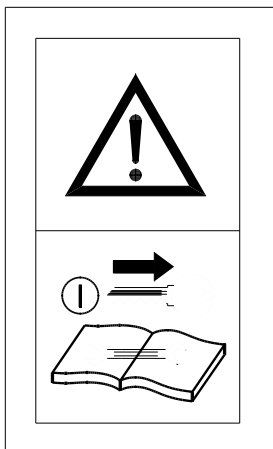
07. Couple the top rod of the three-point to the top link pin of the machine and, if necessary, set the correct length (see fig. 35 pt. 06).
08. Lock the top link pin.

10.3.2 Matching the cardan shaft and the tractor

01. Lift the machine to minimise the distance between the tractor pto and the water pump shaft.
02. Support the machine in a sensible manner if the machine is not on the ground after carrying out the previous action.
03. Check that the cardan shaft matches the manufacturer's specifications.
04. Check whether the cardan shaft can be mounted without modifying its length. If not, shorten the cardan shaft.

10.3.3 Shortening the cardan shaft
(also refer to the instructions that came with the cardan shaft)
**WARNING!**

Apply the tractor parking break, switch off the tractor engine and take the tractor ignition key from the lock.



14. STICKER "VERWIJDER CONTACTSLEUTEL VOOR ONDERHOUD"

01. Slide the cardan shaft over the water pump shaft. Slide the cardan shaft over the pto while holding the thin side of the protective sleeve down.
02. Check that the spring-tensioned catch of the cardan shaft sits in the recess of the pump shaft.
03. Slide the cardan shaft fully in.
04. Measure the distance from the rear of the tractor pto to the front of foremost steel part of the cardan shaft (= for instance 15 cm).
05. Add 1 cm to this distance (= 16 cm)
06. Remove the cardan shaft from the water pump.
07. Take the front section of the cardan shaft (and protective sleeve) from the rear section.
08. Cut 16 cm off: * front cardan shaft section;

- * rear cardan shaft section;
- * front protective sleeve section;
- * rear protective sleeve section.

Note! The above values are only examples.

09. Deburr the cut sections and round off sharp edges.
10. Remove the synthetic and steel sawdust and filings.
11. Coat the sliding splines with lubricating grease.
12. Slide the two cardan shaft sections (and the protective sleeve) back together.
Be sure to slide the sections together in their original orientation!
14. Other modifications to the cardan shaft are not permitted.



WARNING!

Make sure that the two cardan shaft sections are at least half the total sliding length of the cardan shaft into each other when the distance between the pto and the water pump shaft is at its maximum!

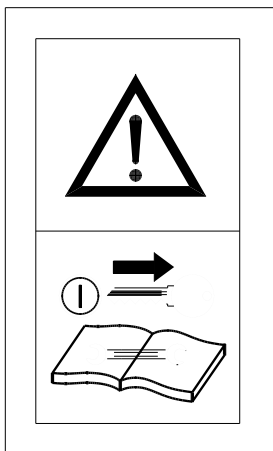
10.4 Working with the machine

10.4.1 Coupling the cardan shaft between the tractor and the machine



DANGER!

Apply the tractor parking break, switch off the tractor engine and take the tractor ignition key from the lock.



14. STICKER "VERWIJDER CONTACTSLEUTEL VOOR ONDERHOUD"

01. Slide the cardan shaft over the water pump shaft. Slide the cardan shaft over the pto while holding the thin side of the protective sleeve down.
02. Check that the spring-tensioned catch of the cardan shaft sits in the recess of the pump shaft.
03. Slide the cardan shaft fully in.
04. Slide the cardan shaft over the pto. Slide the cardan shaft over the pto while holding the thickest side of the protective sleeve upward.
05. Check that the spring-tensioned catch of the cardan shaft sits in the recess of the pto.
06. Prevent the protective sleeve of the cardan shaft from rotating with the two lock chains.

10.4.2 *Coupling the hydraulic quick-connect couplings to the tractor*



WARNING!

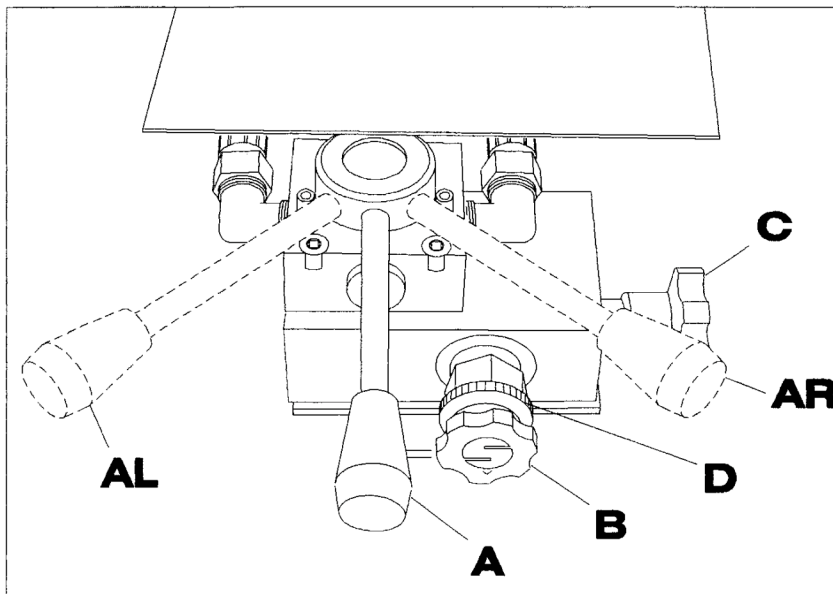
First switch off the hydraulic control valve of the tractor, then move the hydraulic control lever of the machine back and forth a number of times before connecting or disconnecting the hydraulic quick-connect couplings of the machine to/from the tractor.



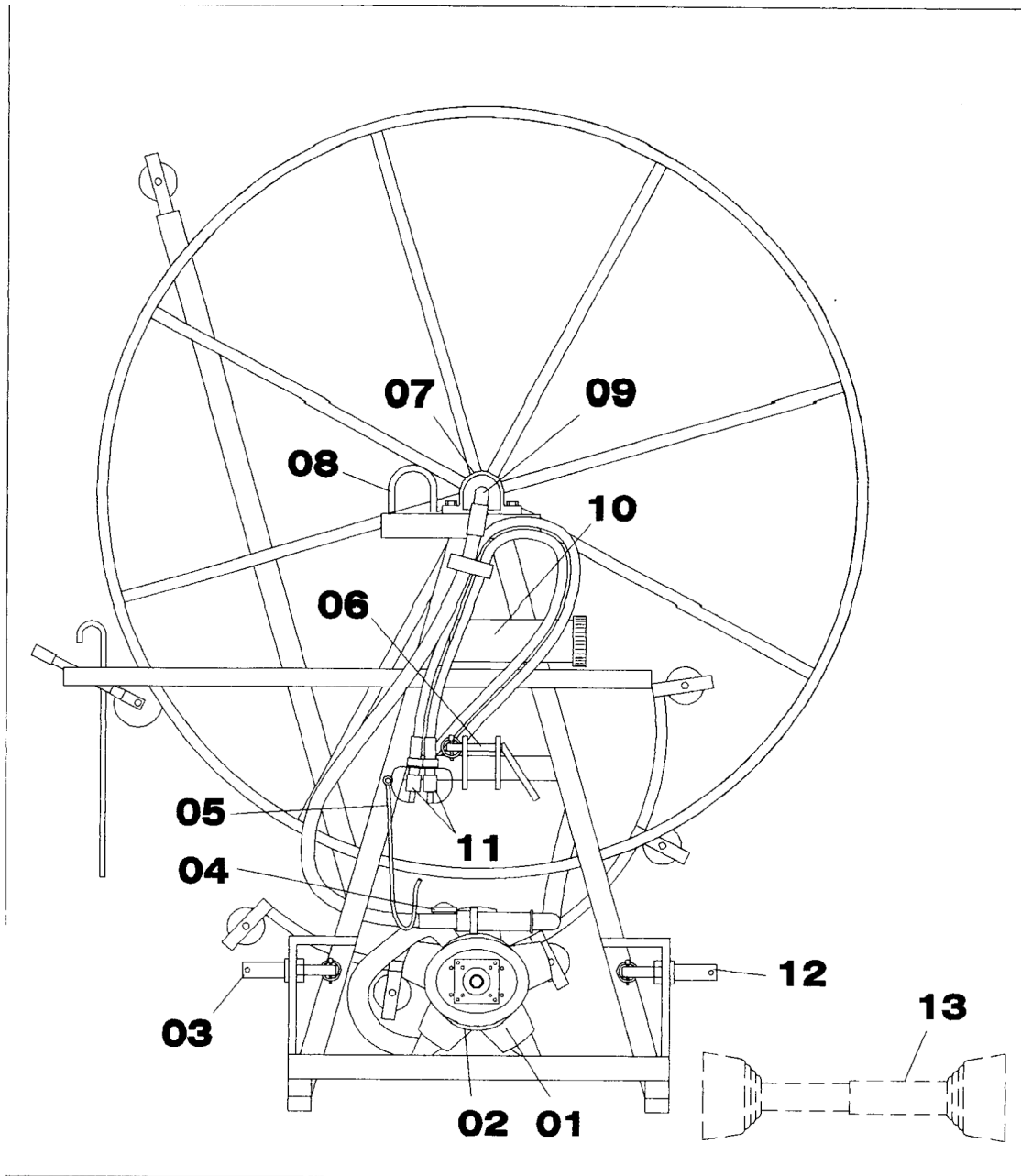
CAREFUL

Take measures to prevent environmental pollution due to spilling hydraulic oil.

01. Check that the hydraulic lever of the control valve is in central position (see fig. 38A).



38 HYDRAULISCHE BEDIENINGS-ORGANEN



35 HOOFDCOMPONENTEN VOORZIJDJE JUNIOR

02. Connect the hydraulic quick-connect coupling for the return (blue to return) (see fig. 35 pt. 11).
03. Connect the hydraulic quick-connect coupling for the supply (red to supply) (see fig. 35 pt. 11).

10.4.3 *Connecting (electrically) and mounting the rear lighting beam* *(Only when using public roads)*

01. Mount the lighting beam (see fig. 34 pt. 47) on the machine.
02. Insert the machine plug into the tractor outlet.
03. Check the correct operation of the lighting beam.
04. Lift the machine into transport position.
05. Check that the rotating light or flashing light (if mounted) for traffic approaching from the rear is clearly visible.
06. Check the presence of the triangle "Slow traffic" (see fig. 34 pt. 12).

10.4.4 *At the working location*

01. Observe all safety instructions as described in the safety chapter of this user manual.
02. Switch on the working lights if you have to work in the dark.
03. Take the plug of the lighting beam from the tractor outlet (if mounted).
04. Lift the machine some 10 cm off the ground.
05. Place the machine at a suitable distance from the drainpipe to be cleaned.
06. Apply the tractor parking brake.
07. Connect the transparent suction hose to the pump suction side and fix it.



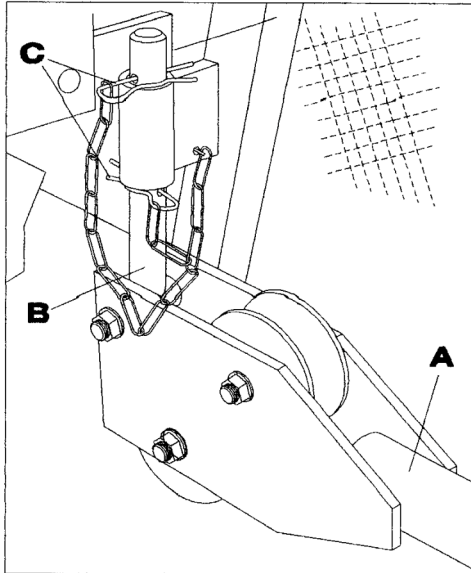
NOTE!

Know the maximum pump head. If it is too high, the pump will not suck in any water.

08. Put the suction basket on the float in a ditch (upstream so the suction basket does not suck in used flushing water) or in a water tanker. If the head is too high, or if there is no suction basket or if it is not clean, the pump must not be activated.
09. Make sure the filter is fully submerged and does not suck in any dirt or air.
10. Connect the yellow overflow hose to the water pressure controller and fix it.
11. Put the hydraulic operating valves block in operating position: loosen wing bolt, slide out and turn to clamp.
12. Put the hydraulic control lever (see fig. 34 pt. 23) of the valve block in central position.
13. Take the top guide arm (fig. 34 pt. 25) from the transport clamp and put it on the machine with the suspension pin, as shown in fig. 42B. The suspension pin can

be placed at various levels. The level to choose depends on the flushing hose position, it must run as level as possible.

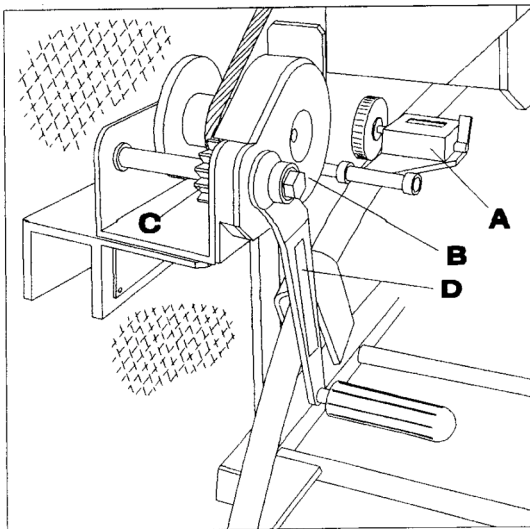
14. Lock the suspension pin with the hairpin lock pins, as shown in fig. 42C.



42 (DE-) MONTAGE BOVENSTE GELEIDINGS-ARM

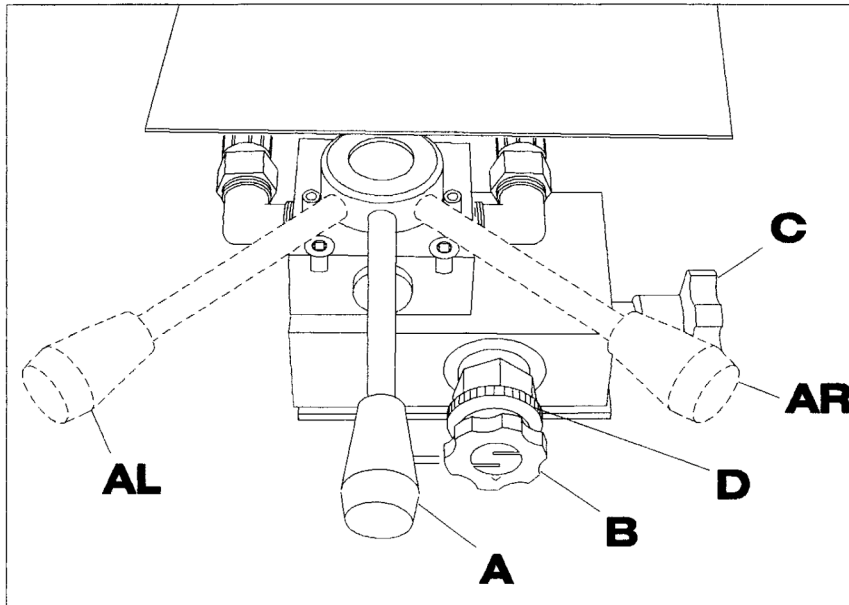
15. Take the support leg (fig. 34 pt. 41) from the transport bracket and put it in the support leg clamp of the top guide arm half, with the T-piece pointing down.
16. Fix the support leg with the wing bolt.
17. Winch out the steel cable using the self-locking hand winch (fig. 40 pt. B), and hook the steel cable on the hook (fig. 34 pt. 24) on top of the top guide arm half.
18. Tighten the steel cable using the self-locking hand winch.
19. Take the guide arm with roller bend (fig. 34 pt. 28) from the clamp and put it in the top half, and fix it with the clamp holder.
20. Place the bottom roller bend (fig. 34 pt. 37) on the top roller bend and fix it.
21. Put the end of the second roller bend in front of the drainpipe discharge opening. This can be done by sliding the guide arm in or out and by operating the self-locking hand winch (fig. 34 pt. 10).
22. Put the support leg (fig. 34 pt. 41) at the correct height when the position (bottom stop) has been determined.
If the drainpipe is under water, positioning the roller bend requires more attention.
23. Determine the upper guide arm position to be observed when driving from and to the drainpipes using the self-locking hand winch (fig. 34 pt. 10).
24. Lock the top position stop using the locking hook (fig. 34 pt. 43).
25. Position the end of the bottom roller bend in front of the drainpipe discharge opening again by putting the support leg on the ground using the self-locking hand winch (fig. 34 pt. 10).
26. Drive the tractor a little forward or backward or horizontally rotate the guide arm a little if the roller bend cannot be placed in front of the drainpipe.
27. Apply the tractor parking brake.

28. Manually feed the flushing hose through the guide arm by moving the hydraulic lever to the left until the flushing hose protrudes from the bottom roller bend.
29. Adjust the pressure roll clamping pressure using the adjusting lever (fig. 34 pt. 49). Do not set the clamping pressure too high.
30. Mount the end piece with guide basket and nozzle if necessary.
31. Fix the roller bend using the supplied fixing pin (fig. 34 pt. 46), when the roller bend has been positioned in front of the drainpipe. That will prevent the roller bend from shifting while the flushing hose is being fed in and out.
When working on the opposite bank, the pin (fig. 34 pt. 33) that is fixed on the second roller bend can be pushed into the bank to fix the end of the roller bend.
32. Set the metres counter (fig. 40A) back to zero **0000** (reset).



40 ZELFREMMENDE HANDLIER EN METERTELLER

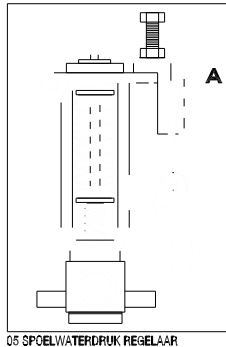
33. Wear adequate eye protection (goggles). The flushing water leaving the drainpipe under pressure may carry off small hard objects at high speed.



38 HYDRAULISCHE BEDIENINGS-ORGANEN

34. Put the right-hand control valve (fig. 38C) fully open (turn anticlockwise).

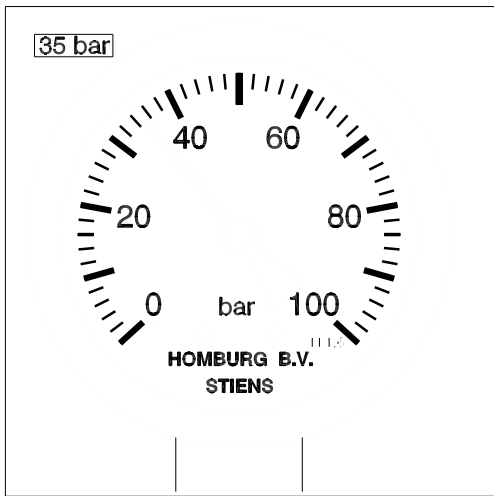
35. Close the hydraulic control valve (see fig. 38A) in the left-hand position.
36. Put the right-hand speed control valve (fig. 38C) slowly clockwise (never shut it!) Feed the flushing hose up to 0.5 metres into the drainpipe.
37. Close the hydraulic control valve (see fig. 38A) in its central position.
38. Set the metres counter (fig. 40A) to zero.
39. Slowly take all tension off the water pressure controller (fig. 34 pt. 20) by taking loose the hook clamp (fig. 05A).



CAREFUL

Do not activate cardan shaft or the water pump when it can reasonably be expected that the water in the pump is frozen.

40. Switch on the cardan shaft (tractor).
41. Set the cardan shaft speed. About 400 rpm (tractor).
42. Wait until all air has disappeared from the transparent suction hose.
If the air does not disappear, the pump does not suck properly or the suction hose leaks or the head is too high. Note! The pump must not run dry for longer than 5 min to prevent damage to the pump.
43. Set the hook clamp (fig. 05A) of the water pressure controller to its highest position (fig. 05A).
44. Check that the flushing water pressure does not exceed 3.5 MPa (35 bar) on the pressure gauge (fig. 18).



18 SPOELWATERDRUKMETER



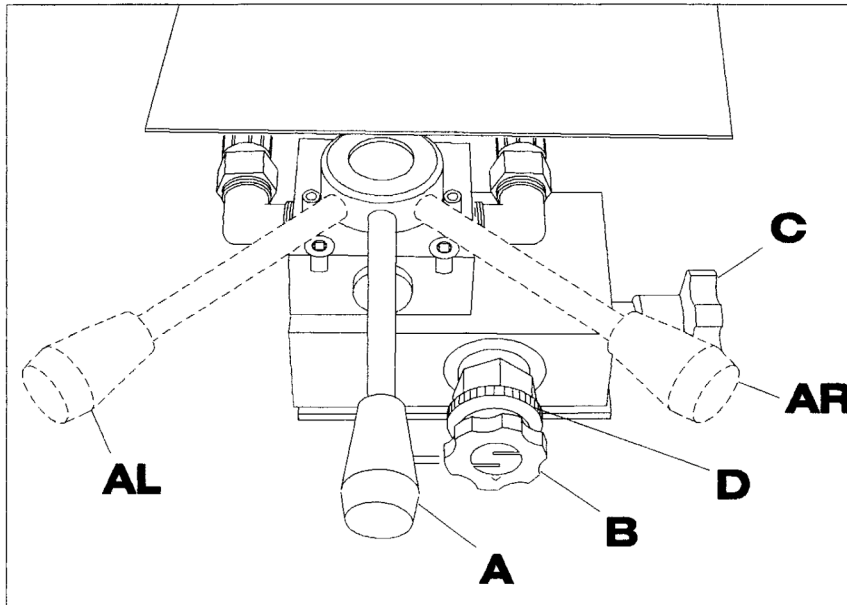
CAREFUL

The water pressure must never exceed 5MPa (50 bar).

45. Set the cardan shaft speed to achieve the smallest possible water flow from the overflow hose. That saves energy. Make sure that the pressure indicated on the pressure gauge (see fig. 05 and fig. 19 pt. 15) remains between 2.5 MPa and 3 MPa (25 bar and 30 bar).

10.4.5 Feeding the flushing hose into the drainpipe

01. Observe all safety instructions as described in the safety chapter of this user manual.
02. Close the hydraulic control valve (see fig. 38A) in the left-hand position.



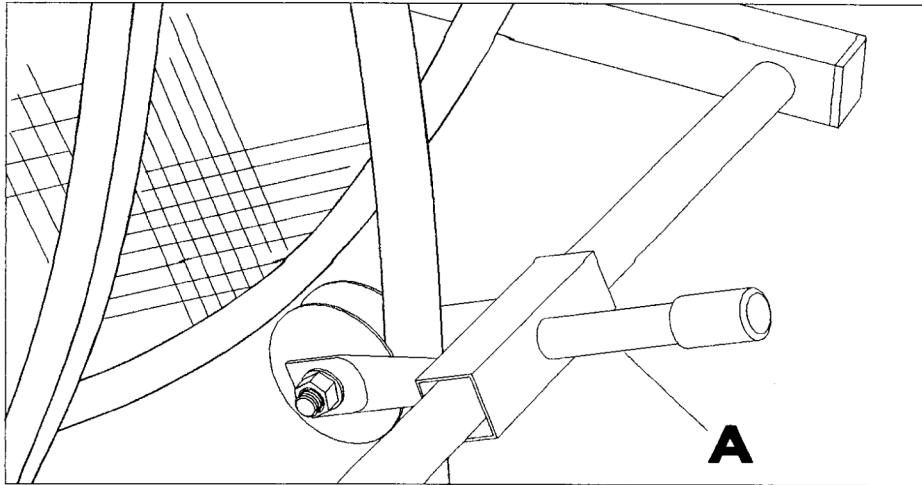
38 HYDRAULISCHE BEDIENINGS-ORGANEN

03. Turn the right-hand speed control valve (fig. 38C) slowly clockwise (never shut it!). That controls the feeding-in speed of the flushing hose into the drainpipe.
04. Make sure the drive wheels do not slip on the hose. That could damage the hose. If the drive wheels are slipping, the resistance is too high or the pressure of the rolls on the flushing hose is too low.
05. Set a feeding-in speed of about 25 metres per minute.
06. Note de metres counter to know when the flushing hose has reached the end of the drainpipe (feeding in 300 m takes 12 min!).
When the nozzle hits an obstacle during feeding in, for instance a blockage, the flushing hose must be moving back and forth at a lower speed in the drainpipe, using the hydraulic lever (fig. 38A) (the right-hand speed control valve (fig. 38C) anticlockwise for a lower speed).
07. Turn the right-hand speed control valve (fig. 38C) fully open (anticlockwise) when the nozzle approaches the end of the drainpipe. That stops feeding in the flushing hose.
08. Directly put the water pressure controller open at the moment in the nozzle doesn't go any further. Also do that in the event of problems such as blockages.
09. Close the hydraulic control valve (see fig. 38A) in its central position.

10.4.6 Feeding out the flushing hose from the drainpipe (reeling in)

HINT!

By manually moving the flushing hose guide (fig. 39A) slowly back and forth during feeding out, the flushing hose can evenly be wound on the reel.



39 SPOELSLANG-GELEIDER

HINT!

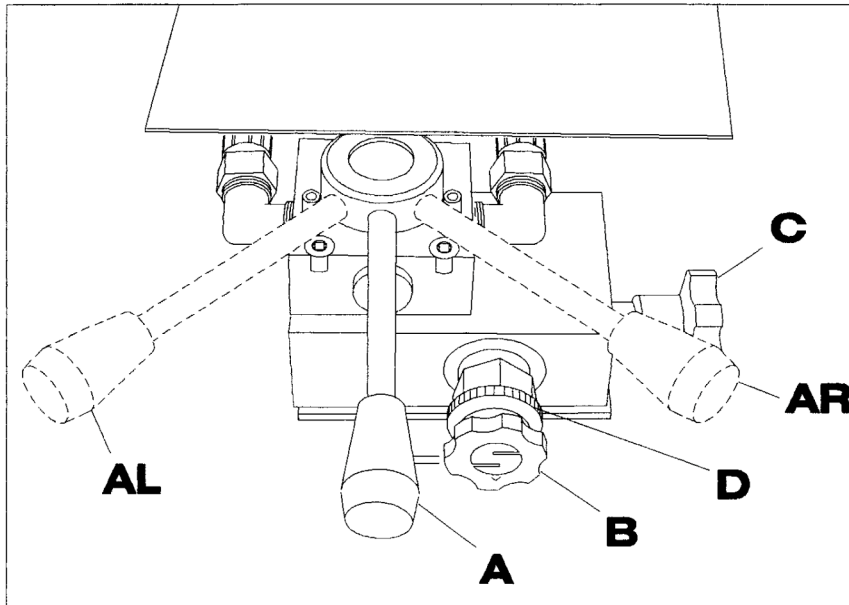
Be sure to reel in the flushing hose as clean as possible to prevent slip and drive problems with the flushing hose. Proceed as follows to achieve this:



WARNING!

The water pressure must never exceed 5MPa (50 bar).

01. Slide the end of the overflow hose over the upturned end of the cleaning tube (fig. 34 pt. 29).
02. Set the cardan shaft speed to keep a pressure on the pressure gauge of no more than 3.5 MPa (35 bar) while water flows out of the cleaning tube (fig. 34 pt. 29).
03. Put the speed control valve (fig. 38C) fully open (anticlockwise).
04. Pull the hydraulic lever (fig. 38A) to the right.



38 HYDRAULISCHE BEDIENINGS-ORGANEN

05. Turn the right-hand speed control valve (fig. 38C) clockwise (never shut it!) until the feeding-out speed of the flushing hose is about 20 metres per minute.
06. Make sure the drive wheels do not slip on the flushing hose. That could damage the flushing hose. If the drive wheels are slipping, the resistance is too high or the pressure of the rolls on the flushing hose is too low.
07. Note de metres counter to know when the flushing hose has reached the start of the drainpipe (feeding out 300 m takes 15 min!).
08. Turn the speed control valve (fig. 38C) fully open (anticlockwise) when the nozzle approaches the end of the drainpipe. That stops feeding out the flushing hose.
09. Close the hydraulic control valve (see fig. 38A) in its central position.
10. Carefully take the tension (open) off the hook clamp (fig. 05C) off the water pressure controller.
11. Switch off the cardan shaft (tractor).
12. Pull the roller bend fixing pin out of the ground (fig. 34 pt. 46).
13. Lift the guide arm using the self-locking hand winch above the lock hook top stop. This top stop also ensures that the guide arm is locked to prevent it from rotating horizontally.
14. Fully slide in the extension pipe.
15. Roll up the suction hose with suction basket and float, and hang them on the machine.
16. Roll up the overflow hose and hang it on the machine.
17. Drive to the next drainpipe with the guide arm folded out. This is the only situation in which driving with unfolded guide arm is permitted.

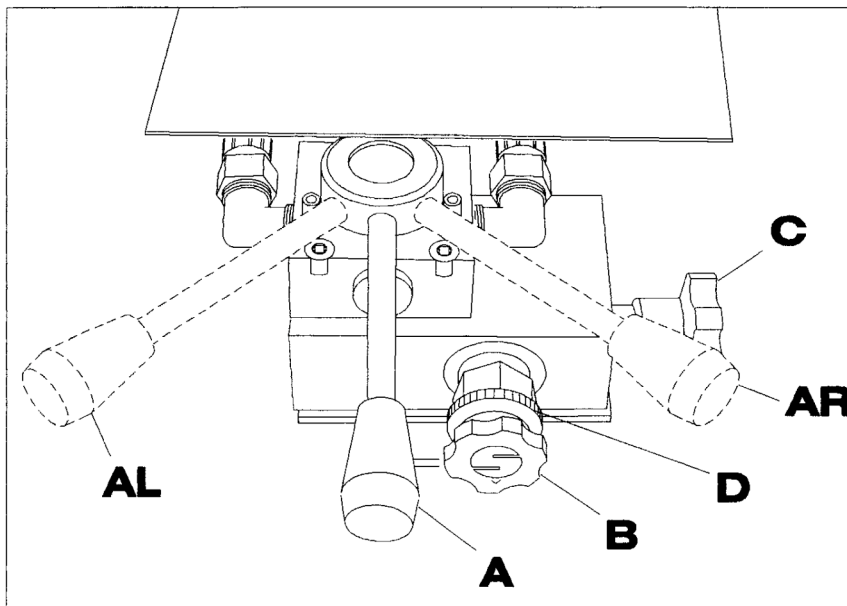


DANGER!

In all other transport situations, particularly when transporting over public roads, the machine must be put completely into transport position.

10.4.7 *Preparing the machine for transport on public roads*

01. Observe all safety instructions as described in the safety chapter of this user manual and ensure that the flushing hose is fully retracted between the rubber wheels as described above.
02. Carefully take the tension (open) off the hook clamp (fig. 05A) of the water pressure controller.
03. Switch off the cardan shaft (lever in tractor).
04. Remove the centring basket from the end piece (if mounted).

**38 HYDRAULISCHE BEDIENINGS-ORGANEN**

05. Close the hydraulic control valve (see fig. 38A) in the right-hand position.
06. Slowly close the right-hand speed control valve (fig. 38C) (clockwise) to pull the flushing hose completely out of the guide arm.
07. Slowly close the right-hand speed control valve (fig. 38C) fully anticlockwise when the flushing hose has been pulled from the guide arm.
08. Close the hydraulic control valve (see fig. 38A) in its central position.
09. Switch off the hydraulic control valve of the tractor.
10. Remove the lower roller bend, put it on the roller bend transport support and lock it (fig. 34 pr. 03).
11. Remove the lower guide arm half with roller bend, put it on the guide arm transport support (fig. 34 pt. 01) and lock it using the clamp (fig. 34 pt. 45).
12. Lower the support leg (fig. 34 pt. 41) to the ground using the self-locking hand winch (fig. 34 pt. 10).
13. Winch out the steel cable further and take the steel cable eye from the hook (fig. 34 pt. 24) on the guide arm.

14. Hook the steel cable eye on the steel cable transport hook (fig. 34 pt. 22) and tighten the steel cable using the self-locking winch.
15. Remove the support leg (fig. 34 pt. 41) from the guide arm, and store it in the support leg transport bracket (fig. 34. pt. 45).
16. Remove the top guide arm half, put it on the guide arm transport bracket (fig. 34 pt. 01) and fix it with the clamp (fig. 34 pt. 45).
17. Put the hydraulic operating valves block into transport position: Wing bolt loose – slide in – tighten wing bolt.
18. Roll up the suction hose with suction basket and float, and hang them on the machine (fig. 34 pt. 08).
19. Roll up the overflow hose and hang it on the machine (fig. 34 pt. 08).
20. Mount the lighting beam on the machine (if required).
21. Insert the machine plug into the tractor outlet.
22. Check the correct operation of the lighting beam.
23. Lift the machine into transport position (lifted some 25 cm off the ground).
24. Switch off the working lights of the machine (if they are on).
25. Check that the rotating light or flashing light (if mounted) for traffic approaching from the rear is clearly visible.
26. Check the presence of the triangle "Slow traffic".
27. Release the tractor parking brake.
28. Drive to the new destination.

10.4.8 Unhitching the machine from the tractor

01. Make sure the machine is on a level surface.



WARNING!

Apply the tractor parking break, switch off the tractor engine and take the tractor ignition key from the lock.

02. Take the plug of the lighting beam from the tractor outlet (if mounted).



WARNING!

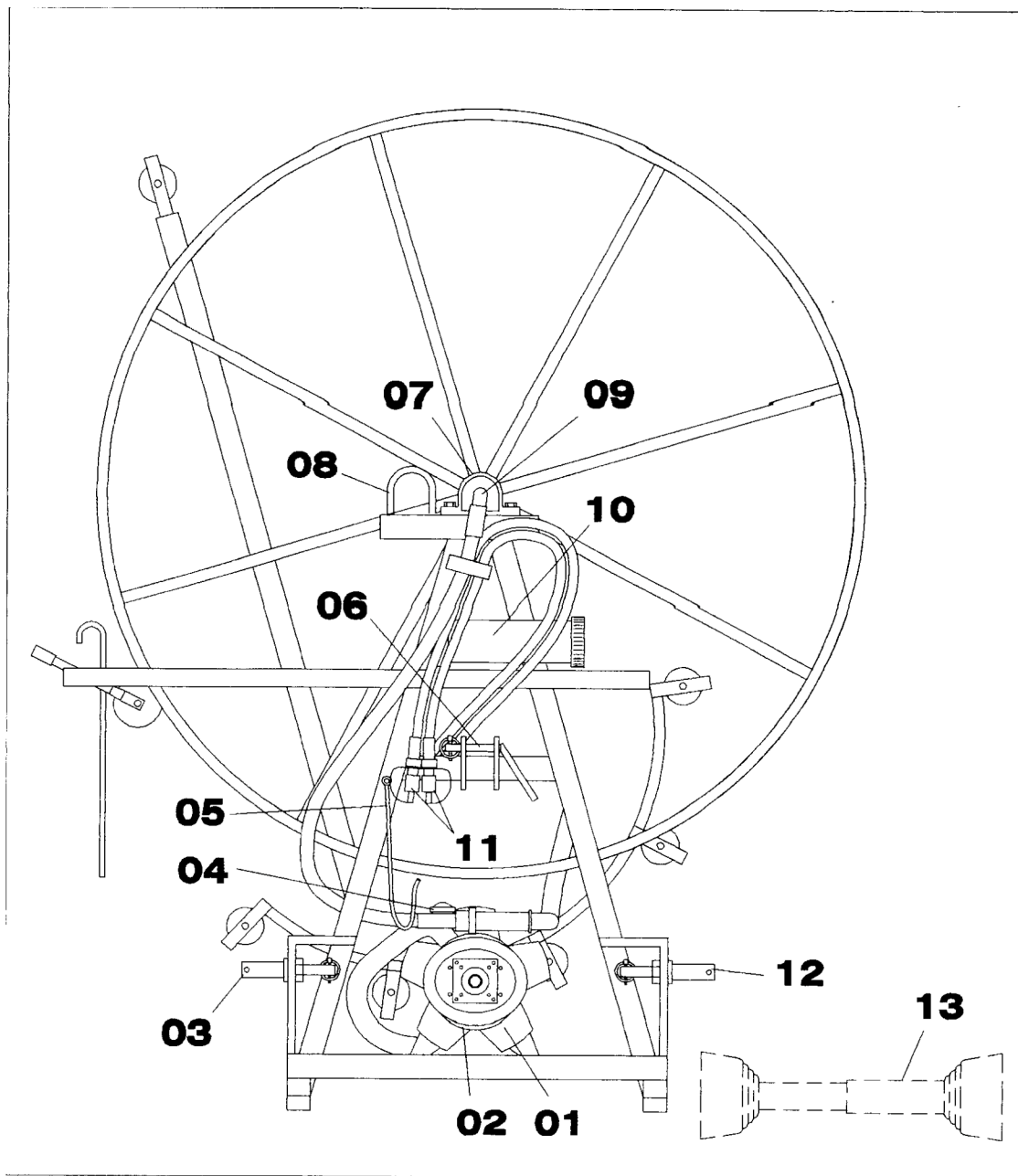
First switch off the hydraulic control valve of the tractor, then move the control lever of the machine back and forth a number of times before connecting the hydraulic quick-connect couplings of the machine to the tractor.



CAREFUL

Take measures to prevent environmental pollution due to spilling hydraulic oil.

03. Check that all hydraulic levers of the machine are in central position.
04. Disconnect the hydraulic quick-connect coupling for the supply (red) (fig. 35 pt.11).
05. Disconnect the hydraulic quick-connect coupling for the return (blue) (fig. 35 pt.11).
06. Loosen the two lock chains of the protective sleeve of the cardan shaft.
07. Push in the spring-tensioned catch of the cardan shaft and slide the cardan shaft off the tractor pto.

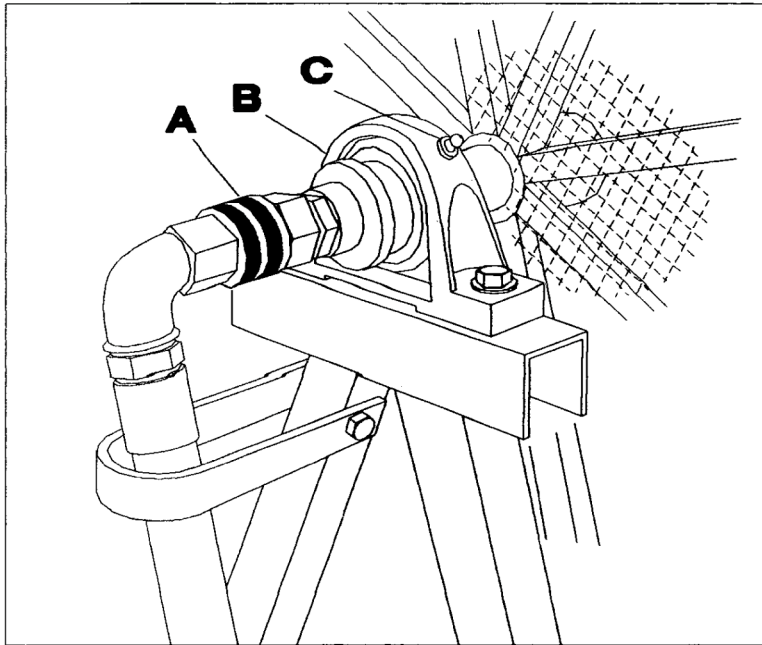


35 HOOFDCOMPONENTEN VOORZIJDJE JUNIOR

08. Hang the cardan shaft on its special support (fig. 35 pt. 05) on the machine.
09. Uncouple the top rod of the three-point suspension from the machine (fig. 35 pt. 06).
10. Uncouple the lower lift arms of the three-point suspension (fig. 35 pt. 03 and 12).
11. If applicable, remove the front weights from the tractor.

10.4.9 Storing the machine

01. Uncouple the central reel coupling (fig. 41A).

**41 HASPELLAGER EN WATERKOPPELING**

02. Remove the nozzle and use pressurised air to purge all water from the flushing hose.
03. Open both valves of the flushing water pump and let the pump run to remove all water.
04. Fill a 10-litre bucket with a mixture of water and anti-freeze with protection up to -25°C.
05. Close both valves of the flushing water pump.
06. Put the end of the suction hose, the end of the overflow hose and the water supply hose of the reel (fig. 41A) in the bucket.
07. Switch on the cardan shaft and let the flushing water pump take up the anti-freeze mixture to prevent frost damage and internal corrosion of the pump and to prevent the diaphragms from drying out.
08. Roll up the suction hose with suction basket and float, and hang them on the machine.
09. Roll up the overflow hose and hang it on the machine.
10. Unhitch the machine from the tractor.
11. Always protect the black flushing hose from intense sunlight, particularly in summer or in tropical areas. That will increase the service life of the flushing hose.
12. Fill the two reel bearing grease nipples (fig. 41C) with grease and grease the central reel coupling (fig. 42A) in.
13. Coat all exposed steel parts with grease.

14. Check the flushing water pump oil level. The level must be at the mark of the sticker on the oil filler pot on the flushing water pump.

11 MAINTENANCE INSTRUCTIONS

11.1 General

Observe all safety instructions as described in the safety chapter of this user manual.

To make the most out of this machine's high quality throughout its service life, it is necessary to accurately follow all maintenance instructions below.

Operators are only allowed to carry out the maintenance and repair described in this user manual. Other maintenance must be carried out by specialised personnel.

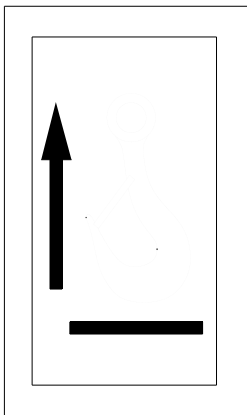
Maintenance must only be carried out by trained and appointed personnel that does not use alcohol, medicines or drugs.

None of the substances on or in the machine are suitable for internal use.

Make sure during maintenance that no oil or grease is spilled on the flushing hose or the drive wheels and the pressure rolls. That will cause slip when feeding in or out.

The settings and accesses sealed by the manufacturer must not be broken. If a seal is broken, that automatically voids the manufacturer's product liability.

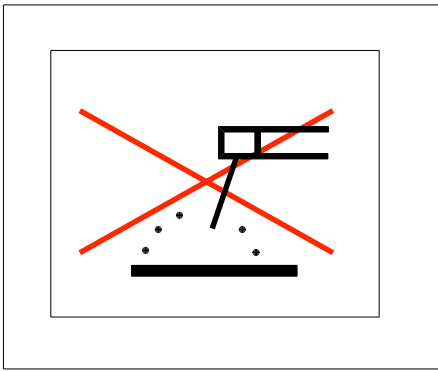
Only hoist the machine on the special hoisting points.



08.STICKER"HIJSPUNT"

Make sure that nobody can start the machine during maintenance and repairs. Therefore, you should fully unhitch the machine from the tractor.

Never weld on the machine without the manufacturer's written permission.



11. STICKER "NIET LASSEN AAN DE MACHINE"

Always observe the safety precautions from suppliers of battery acid, fuels, lubricants, cooling fluid and hydraulic oil.

When working with grease, battery acid, fuel, lubricants, cooling fluid and hydraulic oil, make sure these substances do not end up in the environment.

Never remove a protective casing of an operating machine.

If the machine is used under special operating conditions (for instance: 24 hours a day, 7 days a week, with very dirty flushing water, a modified maintenance schedule must be observed. Consult your supplier in that case.

11.2 *Paint damage*

Paint damage, through mechanical causes or corrosion, must be repaired as follows:

01. Sand the location in question to the plain metal
02. Remove all dust and grease
03. Apply a zinc-based primer
04. Let it dry completely
05. Sand the surface lightly
06. Apply a coat of paint in the original colour of the machine
07. Let it dry completely

11.3 *Cleaning the machine*

The machine can be cleaned with a high-pressure sprayer or a steam cleaner with tap water not warmer than 40°C. Do not use detergent, for that will cause the flushing hose drive wheels to slip.

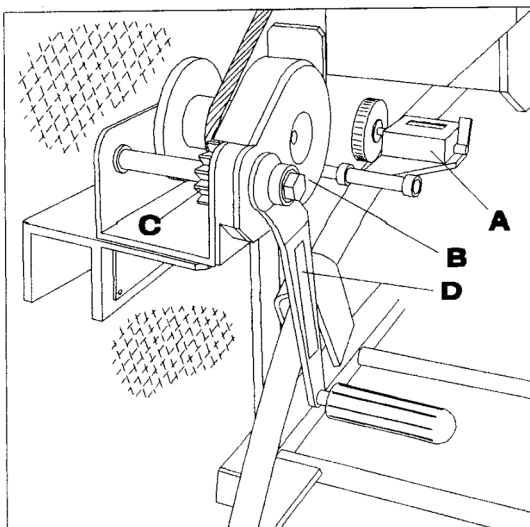
11.4 *Changing oil flushing water pump*

This must be done annually. Be sure there is no air left in the cylinder head after changing the oil of the flushing water pump. The air can be removed by tilting the pump forward and simultaneously rotating the shaft. That way the air between the piston and the diaphragms will disappear (also refer to the manufacturer's instructions that came with the pump).

11.5 Maintenance schedule

Part	8 hours or daily	40 hours or weekly	250 hours or monthly	Qty per machine	Material / Method
Water coupling	Fill with grease	--	--	1	Grease Mollub-Alloy 777-1
Reel bearing	Fill with grease	--	--	2	Grease Mollub-Alloy 777-1
Flushing hose guide	Grease	--	--	1	Grease Mollub-Alloy 777-1
Chain hose drive	--	Lubricate	Check chain tension	1	Grease Mollub-Alloy 777-1
Chain reel drive	--	Lubricate	--	1	Grease Mollub-Alloy 777-1
Swivel points pressure controller	--	Lubricate	--	6	Engine oil 5W30
Suspension pin	--	Lubricate	--	1	Grease Mollub-Alloy 777-1
Cardan shaft	--	Grease / Check protective sleeve	--	3	Grease Mollub-Alloy 777-1
Tractor pto	--	Lubricate	--	1	Grease Mollub-Alloy 777-1
Water pump shaft	--	Lubricate	--	1	Grease Mollub-Alloy 777-1
Water pump	--	Check/top up	--	1.85 litres	Engine oil SAE30/40 Change after 1000 hours
Suction basket	Clean	--	Check	1	Using a brush
Nylon rollers	--	Lubricate	--	29	Engine oil 5W30
Gears hand winch (40C)	--	Lubricate	--	1	Grease Mollub-Alloy 777-1
Nose wheel clamp	--	Lubricate	--	2	Engine oil 5W30

Part	8 hours or daily	40 hours or weekly	250 hours or monthly	Qty per machine	Material / Method
Dust covers quick-connect coupling	--	Check	--	2	Check presence and condition
Hydr. System	--	--	Check	1	Check for leakage
Water system	--	--	Check	1	Check for leakage
Accumulator	--	Check	--	1	0.7 MPa (7 bar)



40 ZELFREMMENDE HANDLIER EN METERTELLER



44 STICKER "TANDWIELEN HANDLIER MOETEN STEEDS ZIJN INGEVET"

11.6 Technical support

If you want to know what your nearest address is for minor and major maintenance and repairs, ordering parts and getting technical advice, you can ask the manufacturer for the telephone number of the current importer in your country. Then this importer can refer you to the dealer or service provider nearest to you.

You can also get information from the dealer where you bought the machine.

12 TROUBLESHOOTING TABLE

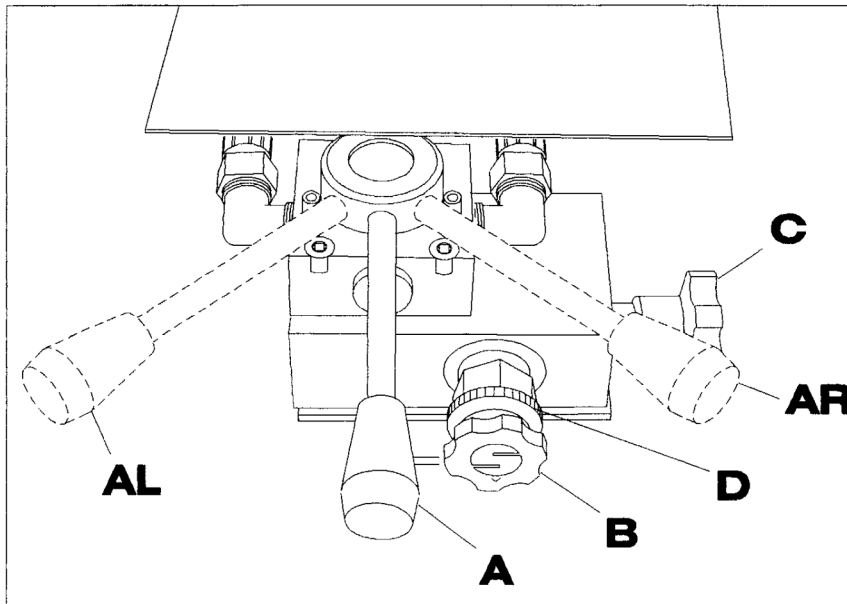
Operators are only allowed to carry out the maintenance and repairs described in this user manual. Other malfunctions must be solved by specialised personnel.

Maintenance and repair must only be carried out by trained and appointed personnel that does not use alcohol, medicines or drugs.

Malfunction	Cause	Solution
Pump sucks irregularly	Suction basket is not submerged Suction basket is fouled Suction basket connection defective Pump valves do not close properly Pressure in accumulator incorrect Leaking suction hose Leaking pump coupling	Submerge suction basket Clean suction basket Repair connection Repair pump Change accumulator pressure Replace suction hose Replace O-washer or coupling
Maximum flushing pressure is not reached	Pump valves do not close properly Suction basket is fouled Leakage water pressure controller Nozzle worn	Repair pump Clean suction basket Replace pressure plate or seat Replace nozzle
Pump loses oil	Oil level too high Diaphragm failure	Lower oil level Repair pump

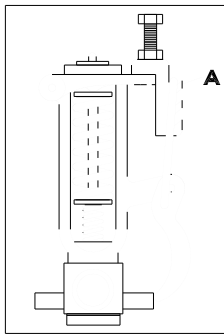
If you find a thick and white emulsion of water and oil in the pump oil reservoir (fig. 35 pt. 04), or if you see slicks in the ditch, a diaphragm has failed. Proceed as follows without delay:

01. Close the hydraulic control valve (see fig. 38A) in its central position.



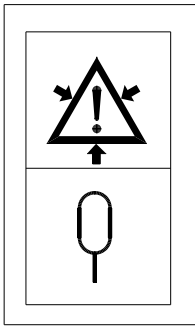
38 HYDRAULISCHE BEDIENINGS-ORGANEN

02. Carefully take the tension (open) off the hook clamp (fig. 05A) of the water pressure controller.



05 SPOELWATERDRUK REGELAAR

03. Switch off the cardan shaft (tractor).
04. Switch off the hydraulic control valve of the tractor.
05. Switch off the tractor engine.
06. Uncouple the cardan shaft from the tractor and from the pump.
07. internally clean the pump with diesel or petrol to prevent corrosion of the pump.



09.STICKER"ACCUMULATOR AANWEZIG"

- 08. Check the diaphragms
- 09. Replace the defective diaphragm

Important: Be sure there is no air left in the cylinder head after changing the diaphragms. The air can be removed by tilting the pump forward and simultaneously rotating the shaft. That way the air between the piston and the diaphragms will disappear.

13 DISPOSING OF THE MACHINE

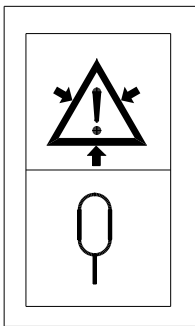
When the machine has reached the end of its technical service life and has to be disposed of, the following should be observed in connection with environment and safety:

Oil and grease (in the water pump):

Dispose of these in an environmentally sound manner as prescribed by the local authorities.

Accumulator (in the water pump):

The gas pressure in the accumulator is high. Only specialised personnel with specialised equipment are allowed to depressurise the accumulator.



09.STICKER"ACCUMULATOR AANWEZIG"

Flushing hose:

The flushing hose is made of HPE-(Hard PolyEthylene) synthetic. Send the flushing hose to a recycling facility that specialises in synthetics.

Guide rolls, suction hose, overflow hose and float:

Made of synthetic material. Send these to a recycling facility that specialises in synthetics.

The rest is mainly made of steel and can be sent off to a scrap iron processing company.

14 LIST OF ILLUSTRATIONS

03	Water diagram
05	Water pressure controller
07	Sticker "Read the user manual first"
08	Sticker "Hoisting point"
09	Sticker "Accumulator present"
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